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SURGERY OF THE LARGE INTESTINE*

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PROPER functional activity of the colon is of vital importance from the standpoint of health. Deviation from the normal is registered most often by constipation, and colicy pains along the course of the large bowel, especially in the region of the caecum, but attacks of diarrhoea may be the dominating feature. Such functional derangements usually stimulate efforts to explain the trouble by some definite lesion of an inflammatory neoplastic or mechanical nature which can be corrected by surgical measures. In consequence, chronic constipation and pains in the right iliac fossa often lead to unnecessary operations, with removal of a so-called chronic appendix, repair of an incompetent ileocaecal valve, plication of a redundant or distended caecum; freeing of kinks or bands, side tracking as ileosigmoidostomy, and even resection of the colon. Unfortunately the symptoms usually persist after such procedures, which are in general ill directed efforts to correct chronic constipation and its associated disturbances by the short cut of surgery.

We are not criticizing thorough and early study of a case; this is essential. We are condemning operations which are not indicated, and these are most frequently done in this region.

Removal of the appendix is of course indicated when symptoms have occurred suggesting disease of the organ, but the other procedures are rarely indicated.

Before even the relatively innocuous operation of appendectomy is undertaken a careful study should be made lest tuberculosis or carcinoma of the colon, inflammation of Meckel's diverticulum, a ureteral stone, disease of the gall bladder or duodenal ulcer—the real cause of the symptoms—be overlooked and discovered later. (Fig. 32.)

This is not of infrequent record. Moreover, it must be remembered that the caecum and appendix occasionally are not situated in the right iliac fossa. It is wise, therefore, in chronic cases especially in children to determine this feature by roentgenogram before operation is undertaken. I recently had a case which illustrates this. The patient was a young boy in whom an intermuscular incision failed to reveal the caecum and appendix, which lay in the left lower quadrant. The cause of such abnormal situation may be complete transposition of viscera, non-rotation, non-descent or long mesocolon. The anomaly must be borne in mind. (Figs. 1 and 2.)

The foregoing is intended, to discourage ill advised and meddlesome surgery; to stimulate full study of a case; and to urge the analysis of all possibilities of differential diagnosis before operation is undertaken.

Most of the lesions of the large intestine, not including the rectum, are situated in

*Read at a meeting of the College of Surgeons, Detroit, November, 1927.

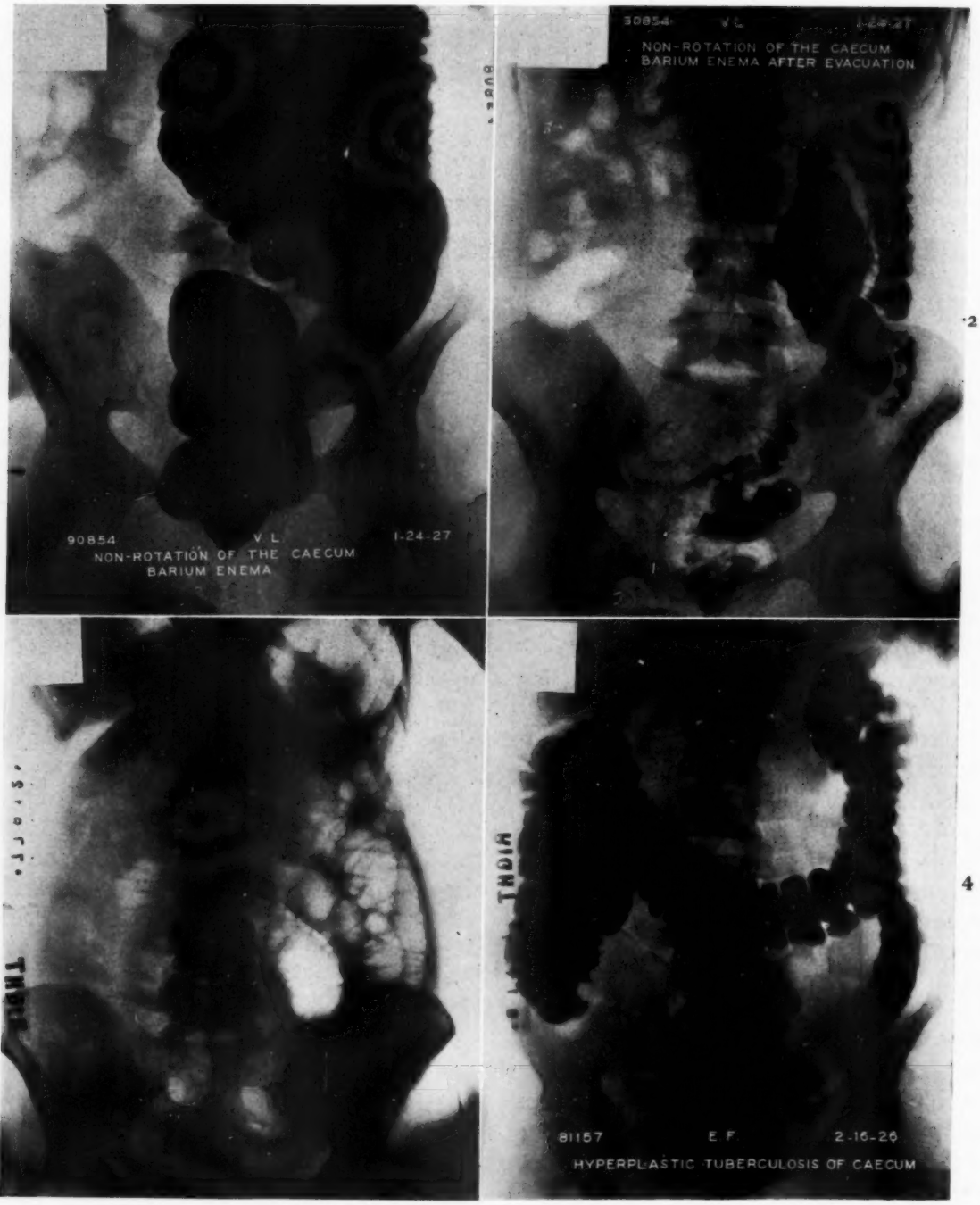

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Fig. 1. Female, eighteen years. Pain in right lower quadrant with nausea and constipation for three days. Left sided appendix. Barium enema showing large intestine on the left side.

Fig. 2. Same as preceding case. Barium enema after evacuation.

Fig. 3. Intestinal obstruction low in ileum showing distended loops.

Fig. 4. Female, forty-four years. For past three or four years has had attacks of nausea and vomiting every two or three months and lasting several days. For one year has had occasional dull pains across lower abdomen. During last attack, three weeks before admission, noticed a painless mass in right lower quadrant. Bowels constipated but normal in character. Physical examination: Well developed and nourished, not appearing ill. Over region of cecum there is a firm, somewhat tender and slightly movable mass 10 × 10 cm. Barium enema shows small filling defect in cecum. At operation an ileocolostomy with resection of caecum, terminal ileum and ascending colon was done for hyperplastic tuberculosis of cecum. Postoperative course smooth. Health excellent to date.

the caecum and must be considered as possibilities in the study of the average chronic case presenting abdominal symptoms. Moreover there is a close similarity of their symptoms. We will therefore first discuss these lesions.

TUBERCULOSIS

Localized tuberculosis of the colon is of more frequent incidence than is usually supposed. Far too often it goes unrecognized. The most frequent sites are the caecum and ascending colon though any part may be affected. While several types of lesions occur, the most significant for the surgeon is the hyperplastic. This is a slow chronic development with marked thickening of the intestinal wall and relatively little ulceration. In general, symptoms develop only when the lumen or the peristalsis of the bowel are affected. The symptoms therefore suggest chronic intestinal obstruction: slowly developing constipation, with periods of diarrhoea, at times with evidence of blood in the stools, colicy pains, local tenderness and ultimately a palpable mass. The general condition of the patient, and evidence of tuberculosis elsewhere are suggestive; while roentgenogram following a barium enema sometimes clinches the diagnosis. The characteristic filling defect of hypertrophic tuberculosis is a complete absence of barium at the site of the lesion; in this respect it differs from that noted in carcinoma. Yet in many cases the two conditions cannot be differentiated in roentgenogram studies. Other lesions than carcinoma also may be difficult to differentiate, even at operation, as inflammatory changes arising from the appendix, or actinomycosis.

When the process has led to stenosis with symptoms of chronic intestinal obstruction operative relief is indicated. When the lesion cannot be differentiated from carcinoma the treatment should be the same as for cancer.

In general, however, tuberculosis of the colon should be treated conservatively. It has been shown, notably by Lawrason Brown,[1] that intestinal tuberculosis can heal completely. Analysis of results in cases treated by surgery and heliotherapy demonstrates that heliotherapy offers by far the better prospects of cure. The treatment must be continued intensively under expert direction for many months. Artificial heliotherapy is less efficient than the direct rays of the sun. The prognosis depends largely upon the extent of associated lesions, notably pulmonary. (See Figs. 4, 37, 38.)

Fig. 5. Male, twenty-two years. In April, 1923, incision and drainage of appendiceal abscess. Following operation had persistent sinus. In November, 1923, sinus was excised and appendix removed. Subsequently complained of constipation and dull "aching" pains in left lower quadrant; patient noticed a small hard mass beneath abdominal wall in left lower quadrant. Operation, February, 1924. Extraperitoneal; mass consisted of a firm wall enclosing a cavity extending into pelvis, containing yellowish granular material in which actinomycosis was demonstrated. Ultimately died.

ACTINOMYCOSIS

Actinomycosis, a microorganism of the fungus variety rather widely distributed in certain grains or other vegetable prod-

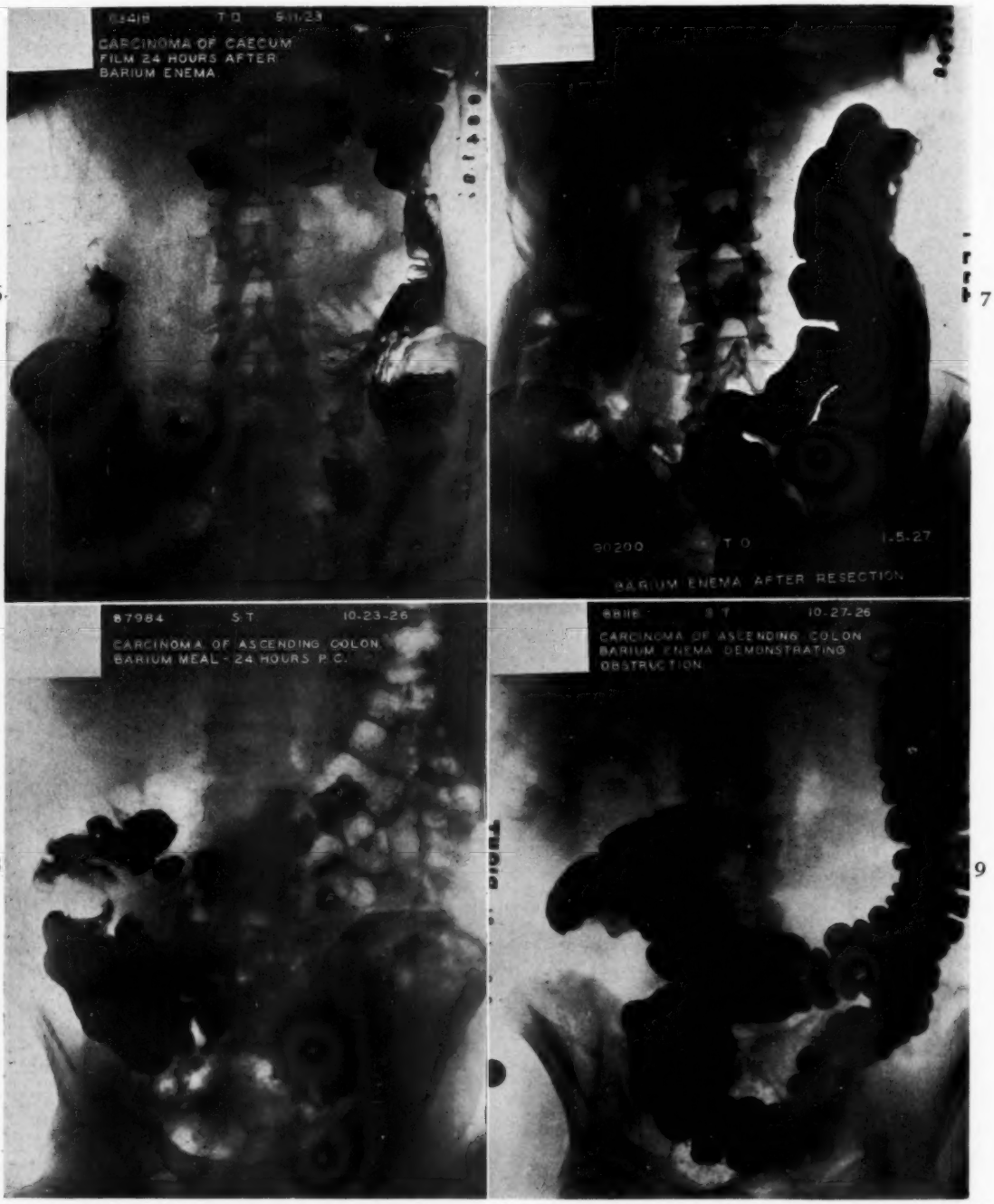

Fig. 6. Female, forty-three years. Six months prior to admission had an appendectomy for acute appendicitis. One month prior to admission began to have attacks of severe cramp-like pains around umbilicus, associated with vomiting. Admitted during an attack and diagnosed acute intestinal obstruction of mechanical origin. Operation revealed a carcinoma of ascending colon. An ileosigmoidostomy was performed and two weeks later resection done. Pathology: adenocarcinoma of colon with metastases in regional lymph-nodes. Postoperative course smooth. Health to date, four and a half years later, excellent.

Fig. 7. Same as preceding. Enema after resection and anastomosis.

Fig. 8. Male, sixty years. For past three months had constipation and pains in right lower quadrant. No blood in stools. Loss of eighteen pounds in weight with increasing weakness. At operation an extensive carcinoma of ascending colon was resected. The regional lymph-nodes were involved. Postoperative course smooth. Developed metastases and died eight months later.

Fig. 9. Same as preceding case. Barium enema.

Fig. 10. Female, thirty-three years. Two months before admission she suddenly developed acute pains in right lower quadrant which radiated to right shoulder. This attack was associated with nausea and vomiting for ten days. Two more similar attacks have occurred. Has lost thirty pounds in weight. Physical examination, essentially negative save for slight tenderness and resistance in right lower quadrant. At operation a large adenocarcinoma of caecum was resected. Smooth course. Health excellent past four years.

Fig. 11. Same as preceding case, after ileocolostomy and resection of right colon.

Fig. 12. Male, sixty-one years. Increasing weakness for three months. Slight afternoon fever. Anorexia and constipation. Mucus and blood found in stools. Physical examination, negative. Barium enema failed to reveal lesion. See Figure 13.

Fig. 13. Same case as preceding. Extensive infiltrating carcinoma of hepatic flexure. Opaque transverse colon displaced mesially disclosing lesion. Note that lesion was recognized only after manipulation of transverse colon. This was done under fluroscope with a wooden spoon. Operation: three-stage Mikulicz. Following third stage patient developed a suppurative thrombophlebitis of iliac veins, and died.

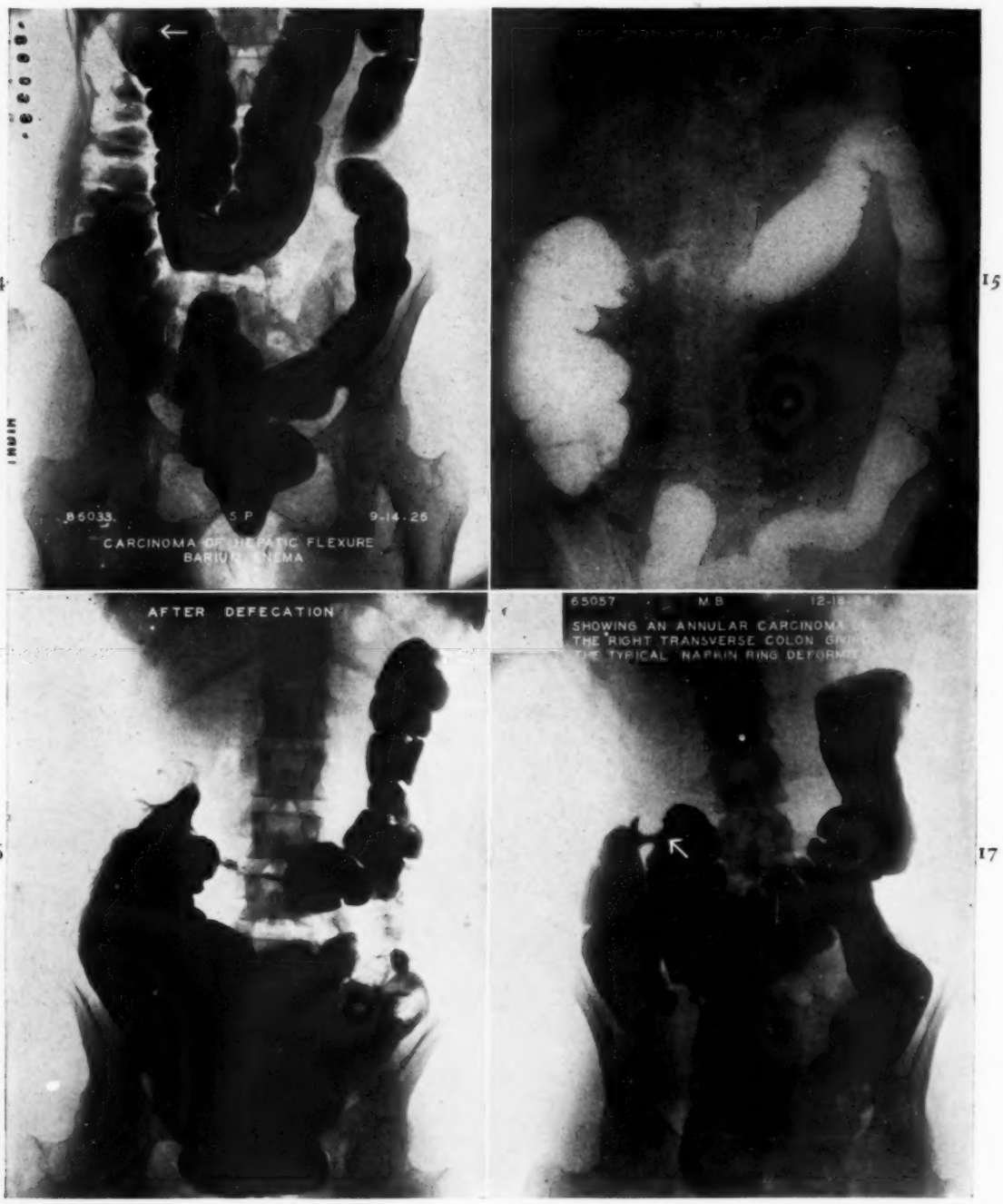

Fig. 14. Female, forty-one years. Pain in umbilical region for three months. Increasing constipation, weakness and loss of 15 pounds in weight. No melena. Operation: resection for carcinoma of hepatic flexure. Pathology: extensive carcinoma of colon infiltrating mesentery. Postoperative course smooth. Developed liver and peritoneal metastases and died nine months later.

Fig. 15. Carcinoma of transverse colon, showing dilatation of proximal bowel.

Fig. 16. Female, thirty-nine years. Increasing weakness, eructation of gas for three months. Pallor, cachexia and blood in stools. Roentgenogram shows carcinoma of transverse colon with filling defect. Operation: resection. Postoperative course smooth. Ultimately died as result of metastases.

Fig. 17. Carcinoma of hepatic flexure. Note "napkin ring" deformity.

Fig. 18. Carcinoma of splenic flexure.

Fig 19. Male, thirty-two years. Began to have attacks of colicy pain below left costal margin one year before admission. Then a free interval for eight months. Then attacks occurred every two or three days. Severity of attacks were in direct relation to constipation. Twice noticed blood in stools. Increasing constipation with "pencil" stools. Examination showed a firm, nodular mass invading colon and mesentery. Inoperable. Caecostomy performed. Postoperative course smooth. Ultimately died.

ucts, occasionally reaches the tissues from the intestinal tract. It grows in characteristic fashion as colonies of yellowish granules presenting under the microscope radiating filaments. The ileocaecal region is the usual site. A slow chronic inflammatory reaction causes marked thickening of the intestinal wall, the adjacent tissues later becoming involved in the process which ultimately invades the abdominal wall and retroperitoneal tissues. The skin breaks down and tortuous fistulae with boardlike induration of the adjacent soft parts develop. In the scant pus the fungus may be recognized.

Two features must be noted: (1) In the early stages the lesion may readily be mistaken for carcinoma, hyperplastic tuberculosis, or chronic inflammation dependent upon the appendix. The true nature of the lesion cannot be recognized at operation. Under these conditions resection is appropriate. (2) Later, when fistulae and extensive infiltration have occurred, radical operation is useless. It simply opens up new areas for infection. (Fig. 5.)

CARCINOMA

The colon is a frequent and relatively favorable site of cancer. Favorable, because

Fig. 20. Female, fifty years. Pain in left lower quadrant and increasing constipation for eight months. Occasionally has distension with audible gurgling. Patient was pale but well nourished. In left lower quadrant there was a firm, tender, freely movable mass. At operation the descending colon was found incorporated in a large, stony, hard mass. There were peritoneal metastases. This is shown to illustrate how an extensive carcinoma may not be noted by roentgenography.

the neoplasm ordinarily is limited in extent, slow in growth and late in metastasizing. Moreover metastases are for a long time confined to the regional lymph-nodes and these can be excised with the growth. While various histological types of cancer occur in the colon and differ in their malignancy, exception to the above characteristics are infrequent. Unfortunately the advantage offered by the slowness of growth is often sacrificed by late recognition of the lesion. Cases are often not recognized until a mass is palpated or signs of intestinal obstruction are present. Yet there are usually suggestive clinical features which should lead to investigation, correct diagnosis and relatively early surgery. These are blood in the stools, abdominal discomfort and derangement of the bowels.

Fig. 21. Female, thirty-six years. Patient suddenly developed acute intestinal obstruction which was relieved by caecostomy. Later an exploration was done. Carcinoma of splenic flexure found and an ileosigmoidostomy performed. At a third stage a resection from caecum to descending colon inclusive was done. Pathology: adenocarcinoma of intestine at splenic flexure extensively infiltrating the wall. Postoperative course smooth. Health excellent eighteen months later.

Blood in the stools due to ulceration of the growth always occurs at some time in the course of the disease and often occurs early, even as the first symptom. It should immediately lead to persistent investigation until the cause of the bleeding is demonstrated. Careful rectal and sigmoidoscopic examinations and roentgenogram studies are indicated. It must be admitted that occasionally bleeding from the bowel occurs which is impossible to explain, for instance, in certain cases of purpura, but one can and should settle the question whether or not cancer is the cause.

Pain or discomfort of a colicy nature with irregularity of the bowels may be the first complaint. The situation of the growth modifies these symptoms. The sigmoid is the most frequent site, then the caecum, then the ascending colon. In cancer of the right half of the colon, diarrhoea usually occurs for a time, whereas progressive constipation is associated with cancer of the left colon. This difference is due to the same factors as render obstruction far less constant in cancer of the right colon than in other parts of the large bowel. Early anemia is the rule and may be quite marked especially in cancer of the right colon. It is due to the persistent though slight bleeding from the ulcerated area.

While cancer here as elsewhere develops most often in advanced life, it must not be supposed that youth is immune; not infrequently it occurs as early as the third decade of life. It is more frequent in men than in women.

As the growth advances the lumen of the bowel becomes constricted and chronic or acute obstruction results. This is almost always the case in growths of the splenic and descending colons, but is less constant in those of the caecum and ascending by reason of the large diameter of this part of the colon, their fluid contents and the fact that the annular or napkin ring carcinoma is less frequent in these parts than elsewhere. The bowel above the obstruction distends and its vitality ultimately becomes impaired.

The diagnosis of carcinoma of the colon can usually be readily made by roentgenogram following a barium meal or enema. In some situations, as the hepatic and splenic flexures and particularly the pelvic colon an adjacent portion of the colon may obscure the lesion. Therefore in order to demonstrate the lesion in some cases fluoroscopy, barium meal and barium enema may all have to be employed and even manipulation of the adjacent bowel

Fig. 22. Female, forty-eight years. Perfectly well up to six weeks before admission. Then abdomen became distended, bowels irregular with streaks of blood in the stools. Progressive weakness. Patient cachectic with palpable mass in umbilical region. No operation. Autopsy showed carcinoma of sigmoid with multiple metastases in liver and in lungs. Colon also showed multiple polyposis.

Fig. 23. Carcinoma of sigmoid. Showing distention of colon from chronic intestinal obstruction. Barium enema.

during investigation. One of our cases of cancer of the hepatic flexure illustrates this feature. (See Figs. 12 and 13.)

In the pelvic colon the overhanging intestine often completely obscures the lesion in the roentgenogram; consequently sigmoidoscopy may demonstrate the growth even better than roentgenography. It is important that the possibility of cancer be considered in all cases presenting bleeding or indefinite abdominal symptoms so that early studies may be made. The trouble is that we are too prone to jump at some other diagnosis and not weigh all the possibilities.

We have had three cases—one in the caecum, one in the ascending and one in transverse colon—in which cancer was not suspected before operation, the diagnosis being respectively, duodenal ulcer, cholelithiasis and chronic appendicitis. In all of these roentgenogram of the lower bowel should have resulted in a correct diagnosis.

In this connection it is important to emphasize two general details of diagnosis; first, the importance of a routine rectal and sigmoidoscopic examination; second, the danger of administering barium by mouth in cases of suspected obstruction. This may convert chronic into an acute obstruction and may cause an accumulation of barium above the obstruction which may be disadvantageous if resection is undertaken. In acute cases roentgenogram without barium will often show loops

distended with gas and indicate the position of the lesion. (Fig. 3.)

Before obstruction develops resection is the rule. In the right half this should be done in one stage. The intestinal contents are fluid and probably less infectious, both features being favorable to immediate anastomosis. Side to side anastomosis is the safest in most hands and gives good ultimate results.[2] In the left half the two stage (Mikulicz) operation is infinitely safer and should be the operation of choice.

In acute obstruction a palliative procedure should always be elected, i.e. drainage of the bowel above the obstruction. The diseased bowel is not favorable for an anastomosis and the toxemia resulting from the obstruction renders the patient intolerant of prolonged operation. Radical resection may be done at a later stage.

The important features are: (1) Early operation. In doubtful cases an exploratory operation is indicated. (2) Early recognition of obstruction. The condition of the patient becomes rapidly worse and is often far more serious than appears to be the case. (3) Relief of the retention is paramount to relief of the obstruction. Little time should be spent in seeking the cause. If this is not immediately found the distended bowel should be drained. Subsequently the cause may be determined and treated. (Fig. 21.)

In chronic cases, the cause may be investigated more thoroughly before operation.

While carcinoma is the most frequent cause of obstruction of the colon, other lesions must be considered as possibilities in any case presenting either acute or chronic symptoms. Of these, attention

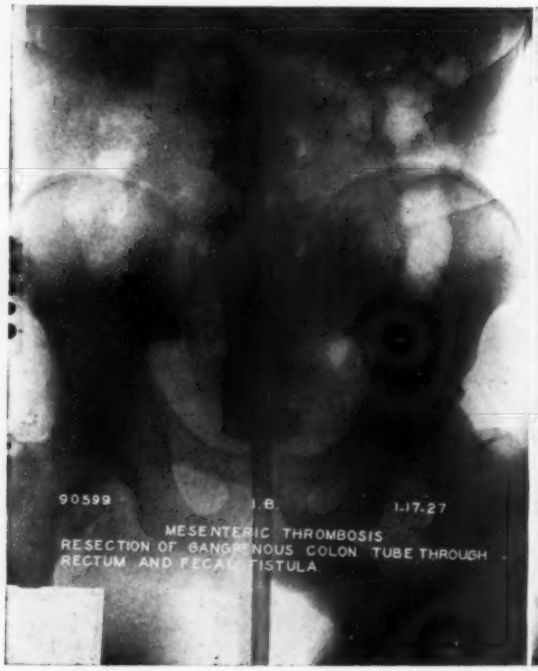

Fig. 24. Male, twenty-six years. Sudden onset of severe intermittent pain in left abdomen. Bowels regular. On second day after admission patient's abdomen became greatly distended with generalized tenderness and rigidity. Prostration was marked. Laparotomy performed under local anaesthesia. An enormously dilated sigmoid (six inches in diameter) gangrenous throughout was found. The distal limb was gangrenous down to rectum. Three stage Mikulicz performed. After slough had separated, tube was passed per rectum and attached to upper limb of descending colon and persistent traction exerted. The upper loop was gradually brought downward toward lower loop of rectum completely bridging the gap. Then the last stage, a closure of fecal fistula, was done with uneventful convalescence. Health now excellent.

Fig. 25. Same case as preceding. Mesenteric thrombosis. Barium meal at twenty-four hours. Shows how upper segment has been pulled down completely bridging gap and completing continuity of the bowel.

must be called to inflammatory bands or adhesions, hypertrophic tuberculosis intussusception, volvulus, and mesenteric obstruction. (Figs. 6 to 23 inclusive.)

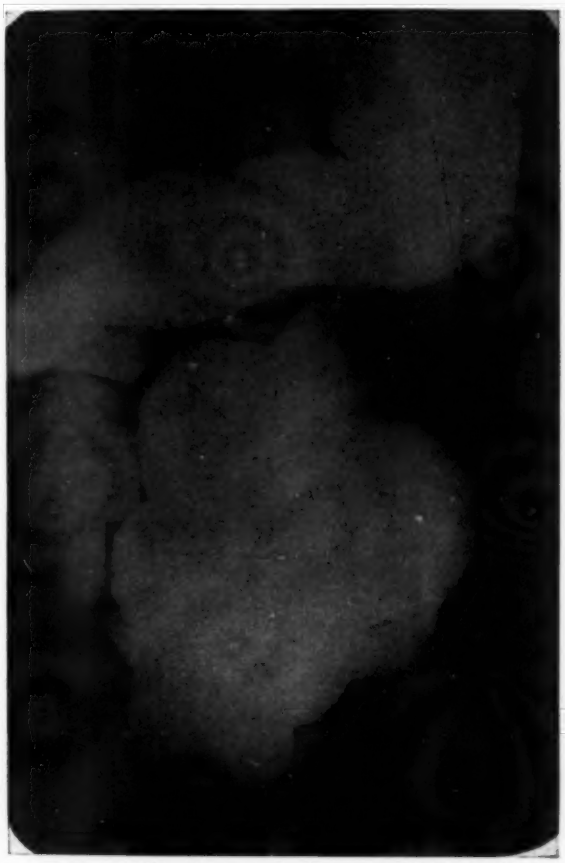

Fig. 26. Hirschsprung's disease (Cole's case).

Fig. 27. Female, fifty-three years. Obese woman. For one month had persistent diarrhea, slight abdominal pain and occasional chills. At operation for suspected carcinoma, a mass enclosing necrotic tissue and pus was found to the left of the sigmoid mass drained. Smooth course. Health good two and a half years later.

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DIVERTICULITIS OF SIGMOID
NOTE SPASM BUT NO DEFINITE FILLING
DEFECT OF SIGMOID BARIUM
ENEMA AFTER EVACUATION

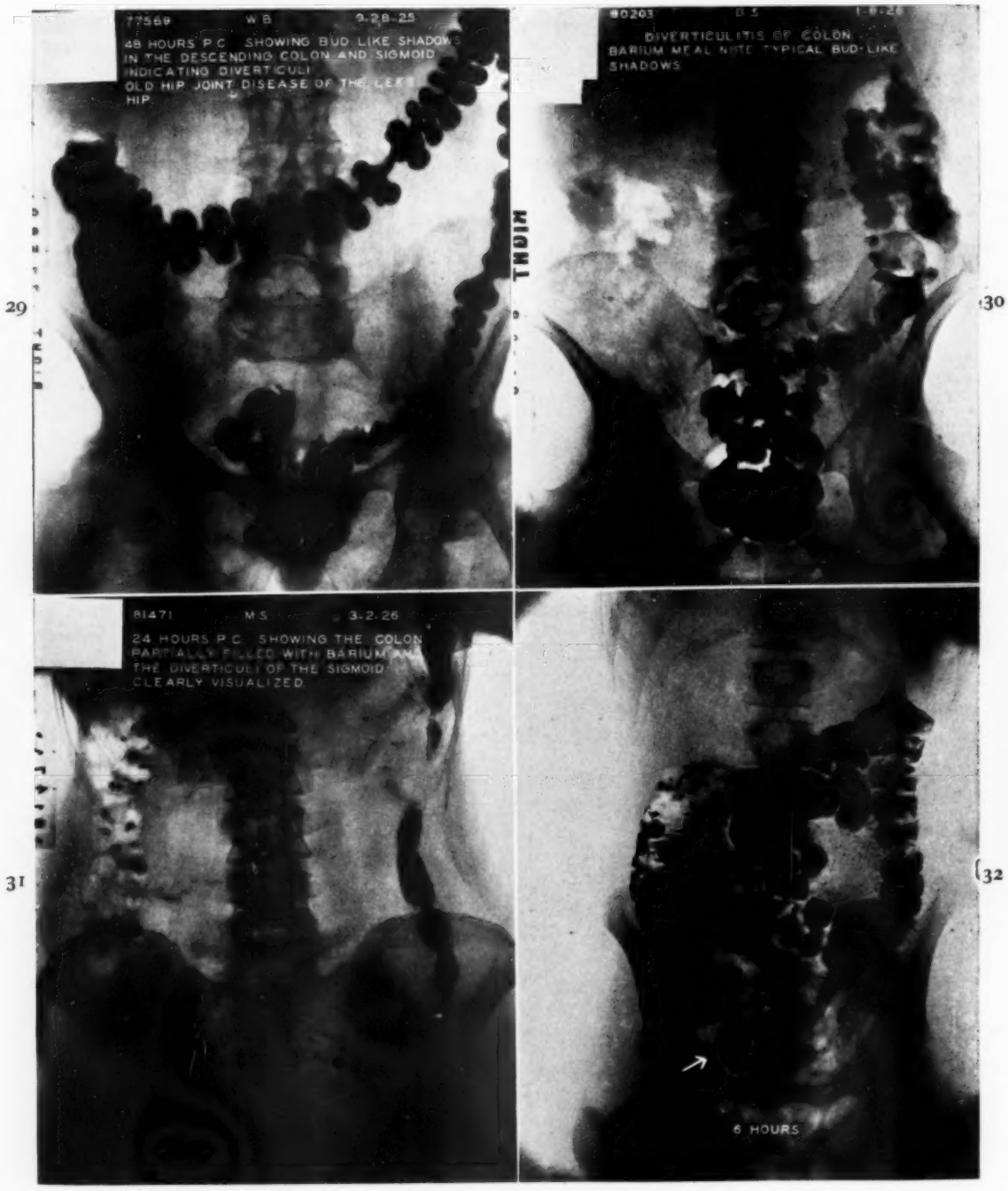
Fig. 28. Same as preceding case, six months later.

INTUSSUSCEPTION

Intussusception, the invagination of one portion of the intestine into another, occurs most frequently in infancy and is the most common cause of acute intestinal obstruction at that age.

The condition originates in some thickening of the bowel wall, prolapse or polyp which projects into the lumen and like a foreign body excites peristaltic contractions. It is thus carried forward causing progressively increasing invagination of the bowel. The ileum into caecum is by far the most frequent type.

The clinical picture is striking and the symptoms characteristic. A healthy child, usually between six and twelve months old, suddenly becomes seriously ill suffering with abdominal pain and vomiting. The pain is severe, colicy and intermittent. Between the attacks the child is quiet and exhausted. Vomiting occurs early, first stomach contents, then bile and finally fecal-like fluid. After the lower bowel is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48 HOURS P C SHOWING BUD LIKE SHADOWS IN THE DESCENDING COLON AND SIGMOID INDICATING DIVERTICULI
OLD HIP JOINT DISEASE OF THE LEFT HIP
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DIVERTICULITIS OF COLON
BARIUM MEAL NOTE TYPICAL BUD-LIKE SHADOWS
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24 HOURS P C SHOWING THE COLON PARTIALLY FILLED WITH BARIUM AND THE DIVERTICULI OF THE SIGMOID CLEARLY VISUALIZED
31
6 HOURS
32

Fig. 29. Forty-eight hours after barium meal. Diverticulitis of descending colon.

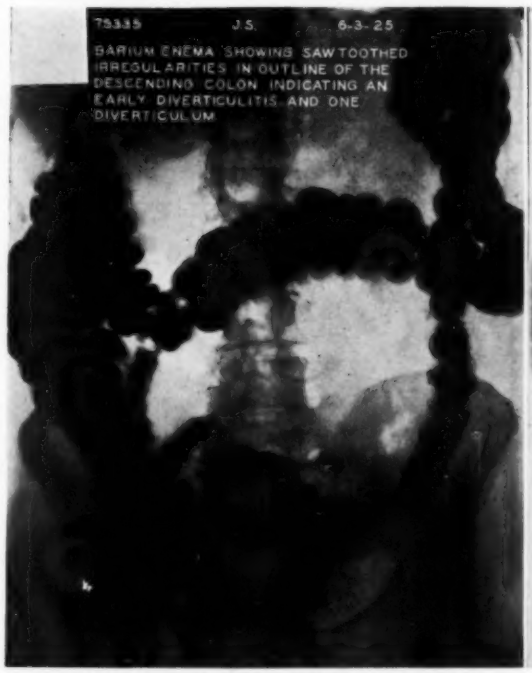
Fig. 30. Male, sixty-seven years. For past year has complained of progressive weakness, loss of weight and strength. Diverticulitis.

Fig. 31. Diverticulitis of sigmoid with retained barium.

Fig. 32. Girl, fifteen years. For five weeks patient has had abdominal pain associated with slight rise in temperature and leucocytosis. Gradual loss of weight and strength. Operation revealed a gangrenous Meckel's diverticulum with abscess at tip adherent to the caecum. Appendix and diverticulum removed. Drainage. Smooth course. Result good.

evacuated, only blood and mucus are passed. Between the attacks of colic the abdomen is relaxed and a sausage shaped tumor can usually be felt in the abdomen even a few hours after the onset. It is not always in the right iliac fossa. The invaginated bowel may also be palpable by rectum.

Early laparotomy is essential. The patient should be carefully guarded from shock by warmth, clyses, etc. In early cases[3] it is usually possible to reduce the intussusception, great gentleness being observed. Later, resection is necessary. The important factors are early diagnosis and early operation.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BARIUM ENEMA SHOWING SAW TOOTHED IRREGULARITIES IN OUTLINE OF THE DESCENDING COLON INDICATING AN EARLY DIVERTICULITIS AND ONE DIVERTICULUM

Fig. 33. Early diverticulitis of descending colon.

Fig. 34. Diverticulitis.

MESENTERIC OBSTRUCTION

Mesenteric obstruction occasionally occurs in the colon and is due either to embolus from a heart valve or thrombosis of a mesenteric vein. A partial form has been described by Klein[4] in which function, that is peristalsis, is affected without interference with the vitality of the bowel. We have had one case which could be explained only in this way. Diarrhea with blood in the stools and indefinite abdominal symptoms often precede the onset of the serious symptoms of intestinal obstruction by several days. If operation is performed during this period, resection may be successful; later the condition is usually fatal. (Figs. 24 and 25.)

Volvulus consists in torsion of an intestinal loop usually the sigmoid and most often occurs with idiopathic megacolon, as described by Hirschsprung.

The rotation produces intestinal obstruction. The symptoms demand immediate operation. Correction of the torsion, detorsion, is often sufficient. Some authorities also recommend fixation of the bowel to the abdominal wall to prevent recurrence. If the bowel is enormously dilated it may be necessary to aspirate its contents and possibly do a colostomy. If its vitality is affected multiple stage resection may be necessary.

HIRSCHSPRUNG'S DISEASE

In about two-thirds of the cases of Hirschsprung's Disease all of the colon is involved, in the others the dilatation is

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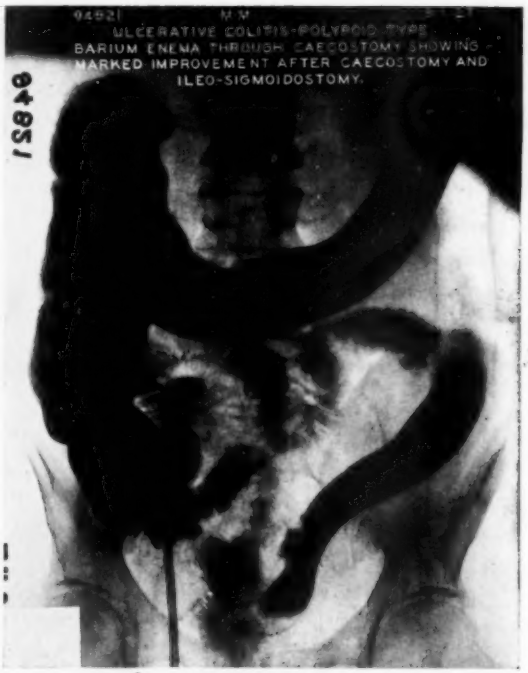

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Fig. 35. Male, sixty years. Persistent diarrhea for twenty-five years with three to six liquid stools a day. At times considerable mucus and blood in stools. January, 1926, caecostomy done and colon irrigated. No improvement. Later, exploration. Colon markedly thickened and contained small nodules. Ileosigmoidostomy performed. Condition improved. (Hitzrot's case.)

Fig. 36. Same as preceding case. Enema shows improvement after ileosigmoidostomy.

Fig. 37. Male, twenty-six years. Sudden onset of generalized abdominal pain three weeks before admission associated with diarrhea and loss of thirty-three pounds in weight. No blood in stools. Patient poorly nourished and acutely ill. Signs at lung apices and sputum positive for tubercle bacilli. Abdomen generally tender. Treated conservatively and improved.

Fig. 38. Same as preceding case. After irrigations and heliotherapy.

confined to the pelvic colon. The cause is obscure. The dilated colon causes kinking at its junction with the undilated lower portion resulting in accumulation of feces, gradual dilatation and hypertrophy of the intestinal wall and finally complete loss of peristalsis.

The significant symptoms are marked constipation from infancy, and distention of the abdomen. The roentgenogram gives a characteristic picture. As a rule the condition becomes progressively worse and death occurs during childhood from some intercurrent infection.

In treatment irrigation of the bowel should be systematically done. If this is not sufficient a caecostomy may be resorted to. Resection however is the best procedure. This may be done in one stage in a good risk, especially if the bowel can be emptied; otherwise, a two stage resection is preferable. (Fig. 26.)

DIVERTICULITIS

Diverticulitis of the colon has in recent years come to occupy an important place in abdominal surgery. The small saccula-tions or outward projections of the intestinal mucosa are usually multiple and may occur in any part of the colon. The sigmoid however is by far the most frequent site. As a rule, diverticula do not give rise to symptoms, the patient is not even aware of their existence. Their significance is due entirely to the fact that occasionally an inflammatory reaction occurs, probably excited by retention of intestinal contents. While the inflammatory changes simulate those which occur in the appendix vermiformis there is one very important difference. The diverticulum is short, its blood supply is not so readily arrested, necrosis and perforation are therefore slow; the diverticulum moreover is separated from the peritoneal cavity by a layer of fat of variable thickness. The inflammatory process advances less rapidly and walling off with abscess formation is the rule, diffuse peritonitis rarely occurring.

Chronic symptoms occasionally occur represented by repeated attacks of discomfort or pain in the left lower quadrant with frequent and inadequate stools. Febrile attacks with localized tenderness and pain may also occur. Diagnosis is readily made or confirmed by roentgenogram following an opaque meal. The sacculations are clearly demonstrated; they often retain the barium after evacuation of the bowel.

Fig. 39. Male, forty-one years. Pain in abdomen, diarrhea, blood in stools for seven weeks prior to admission. Before each bowel movement has griping pain in lower abdomen. Exploration showed involvement of whole large intestine. The sigmoid contained a number of small, hard nodules. Cecostomy performed. Diarrhea improved under local treatment. (Hitzrot's case.)

The significant features are: (1) diverticulitis is a disease of adult life. (2) The symptoms are similar to those of acute or subacute appendicitis, but the lesion being usually in the sigmoid, the symptoms are referred to the lower left quadrant, and are therefore like a left-sided appendicitis. (3) The inflammatory process almost invariably becomes walled off and leads to abscess and not to diffuse peritonitis.

Treatment. Operation is very rarely

indicated for chronic symptoms. Occasionally a chronic inflammatory process leads to exploration under doubtful diagnosis. The inflammatory reaction may have caused such thickening and induration of the bowel wall as to lead to a justifiable suspicion of carcinoma. Under such conditions resection may be indicated.

Acute symptoms indicate operation. Operation should in general be delayed until abscess formation, that is complete walling off of the products of inflammation. For the reasons given, such delay is safe if the case is carefully watched. The proper surgical procedure is drainage of the abscess and nothing else. Resection is not indicated and is to be condemned. (Figs. 27 to 34 inclusive.)

Fig. 40. Male, twenty-nine years. Admitted in 1923 to medical service for chronic colitis. Several small ulcerations of rectum seen. Barium enema negative. Was entirely well after leaving hospital, save for occasional diarrhea. Fifteen days before second admission, noticed that abdomen was tender to touch just to the left of the umbilicus. No other symptoms. Physical examination showed a palpable, tender slightly movable mass, 6 cm. in diameter to the left of the umbilicus. Protoscopic examination, negative. White blood cells 21,000; polys. 58 per cent; lymphos. 19 per cent; eosinophiles 12–15 per cent. Operation: mass involving transverse colon; three stages resection. Pathology: large abscess 10 × 6 cm., communicating with a perforation in wall of transverse colon. Amebae were found in the pus. A caecostomy was performed at the time of closing the fecal fistula. Smooth course. Caecostomy closed spontaneously. Result good.

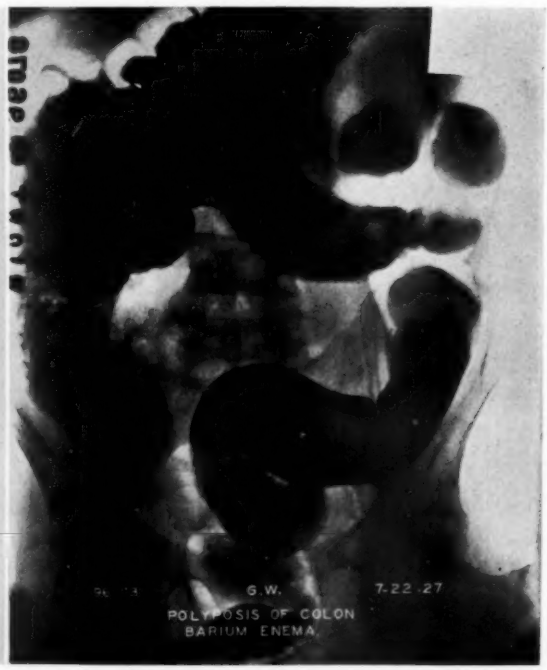

Fig. 41. Male, forty-seven years. Attacks of pain in left lower quadrant with diarrhea and blood in stools for eight months. Physical examination showed a poorly nourished man appearing chronically ill. In left lower quadrant there are several small, hard, non-tender movable masses.

COLITIS

Idiopathic ulcerative colitis is of fairly frequent occurrence. The lesions develop first in the rectum, and later involve the bowel wall higher up. The mucous membrane is first congested then small abscesses develop. The ulcers result from sloughing of the wall over the abscess. The cause is unknown. The symptoms are pain, diarrhea with blood in the stools, tenderness along site of the colon, at times fever. The course is protracted and marked by remissions and exacerbations. In severe cases anaemia is marked and the patient becomes extremely weak and prostrated. Diagnosis is made by study of the stools, proctoscopy, sigmoidoscopy and roentgenogram. Amoebic and tuberculous ulcerations must be excluded. Treatment on the basis

of recent studies[5] should include, besides local measures, correction of distant foci of infection and perhaps vaccines. In refractory cases surgery may be indicated. This consists in establishing a fistula at the caecum, which puts the bowel somewhat at rest and allows better application of local measures. Ileosigmoidostomy has also been advised.[6] (Figs. 35, 36 and 39.)

AMOEBIC DYSENTERY

In amoebic dysentery ulcers occur in any part or throughout the whole of the large intestine, but the caecum is a favorite site. The ulcers are described as rather characteristic, with a relatively small opening in the mucous membrane which leads to a cavity in the submucous coat. They have been referred to as flaskshaped. Occasionally an ulcer perforates the intestinal wall and causes an abscess in the adjacent tissues. In the course of the disease abscess of the liver not infrequently occurs and is a serious complication. The symptoms are attacks of diarrhea with at times mucus and blood in the stools. The patient ultimately becomes anaemic, emaciated and weak. The diagnosis depends upon finding the amoebae in the stools. The condition is usually readily held in check or cured by emetin, e.g. grain i.q.d. for 7–10 days. Local measure should also be employed. (Fig. 40.)

POLYPOSIS

Polyposis of the colon must be referred to as of some diagnostic importance. The lesion consists in tumors which vary in size from a few millimeters to several centimeters projecting into the lumen. They are usually scattered along the whole length of colon and rectum in countless number, though occasionally they are few and limited in extent. Their structure is "an adenomatous hyperplasia of the intestinal mucous membrane."[7] They often give rise to symptoms at an early age, namely hemorrhage and diarrhea. They show a marked tendency to malignancy (40 per cent). (Fig. 41.)

This lesion must be thought of in unexplained rectal hemorrhage especially in youth. Palliative treatment is unreliable; and resection is rarely successful on account of the extensive and low distribution of the lesions.

The object of this paper is to urge that in the study of obscure cases with indefinite abdominal symptoms full consideration be given to the large intestine. It is felt that this important area is far too often overlooked.

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A METHOD FOR PRODUCING BLOCK ANESTHESIA OF THE SACRAL NERVES*

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FOR many operations, such as those on the rectum, in the urinary bladder, and on the perineum, anesthesia is ordinarily satisfactory when the sacral nerves have been anesthetized. Data published previously support this opinion.† The technic of sacral nerve block has been described elsewhere,‡ but deserves representation whenever it is refined. Although indications and contraindications[30] may long remain stationary, technic gradually alters. I hope that ultimately a simple and effective method will result. Obviously it is only in minor details that the method now presented varies from that described previously.[31,34]

POSITION OF PATIENT DURING INJECTION

The subject is placed in the prone position with the longitudinal axis approximately parallel to that of the cart or table. The hips are elevated about 7.5 cm. by a pillow or other means. Occasionally it is advantageous not to elevate the hips; this is true in thin subjects, especially if the sacral region is prominent.

It is interesting to note that the introduction of the caudal needle is facilitated, especially in fat persons, if the patient rests the left side of his head against the pillow when the anesthetist is right-handed, and vice-versa. The patient's arms should not be under his chest.

Every experienced regional anesthetist who teaches methods of blocking the sacral nerves has hit upon similar devices. It has been my experience in teaching that if this technic is followed it will increase the percentage of easy cases and reduce the difficulties. No previous skill or experience is necessary to execute these apparently minor points, and when such suggestions are followed less skill is required to insert the needles into the bony foramina. It is desirable that regional anesthesia, especially sacral block, should be widely used or that the methods at least be familiar to as many as have use for them. For this reason I shall attempt to offer suggestions, especially to the inexperienced, which make for a rather easy and effective method of inducing sacral nerve block.

SOLUTION AND ARMAMENTARIUM

The skin over the sacrum and adjacent area is surgically prepared first with ether and then with a 2 per cent solution of mercurochrome in acetone and alcohol. A small sheet with a medium-sized perforation makes a suitable drape. The armamentarium is next put in order.[32] The plunger and barrel of the syringe are removed from the solution in which they have been sterilized. The syringe is ready after it has been rinsed in sterile water and put together. Needles are sterilized by boiling. The lumen of a needle is protected by a stilette, the point and external surface by a metal guard.[22,32,37] Each needle is separated from its protector and stilette and irrigated with a few drops of sodium chloride solution. A 100 c.c. cup is filled with physiologic solution

† Refs. 21, 31, 34, 39, 40.

‡ Refs. 1–3, 5–20, 22–29, 31, 34, 35, 38, 41–63.

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of sodium chloride which has been brought to body temperature, and to this is added, from an ampule, 5 c.c. of 20 per cent procaine solution. The content of another ampule containing 1 c.c. of 1:2600 epinephrine solution is then aspirated into the syringe and discharged into the sodium chloride-procaine solution. The cup containing the procaine-epinephrine solution is marked with a small piece of red cloth to indicate the character of its contents. The solution is thoroughly mixed by repeatedly filling the syringe and discharging it back into the cup. Epinephrine is not used in the presence of goiter,[4,33,36] in cases of hypertension, in the presence of certain cardiac conditions, or if the patient is being prepared for cystoscopic examination.[31]

LOCATING AND RAISING THE PRIMARY SKIN WHEAL

A fine wheal needle, 10 mm. or less in length, is attached to the syringe, which has been filled with the procaine-epinephrine solution. One should now prepare to make the skin wheal through which the caudal needle is to be thrust. I have previously emphasized the importance of locating the primary wheal properly.[31] A manual teaching exercise previously described[31] often facilitates an

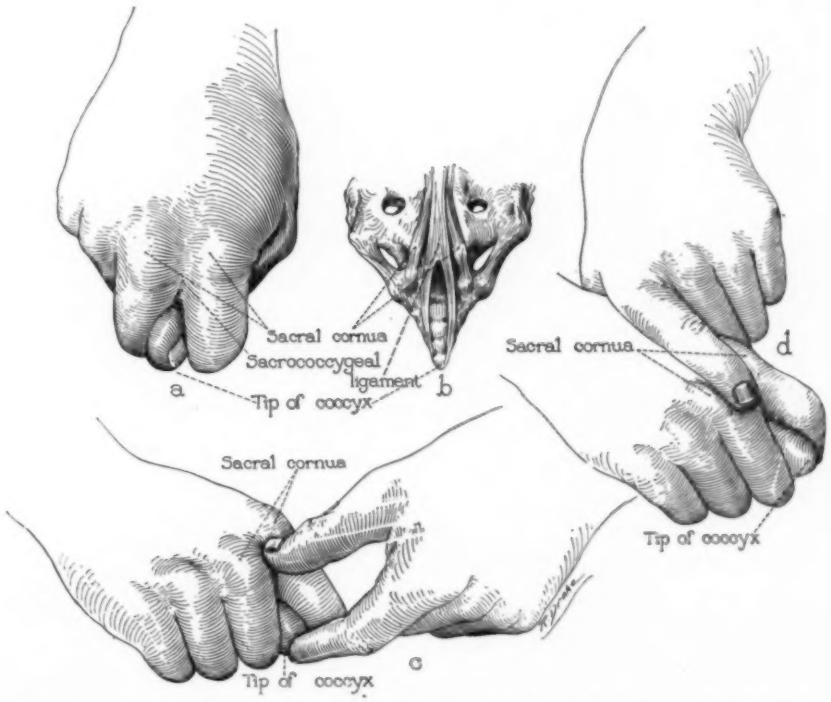

Fig. 1. Manual teaching exercise showing how the sacral hiatus is palpated. Extend the right thumb well through between the fully flexed first and second fingers of the right hand (A). Turn the back of the right hand upward. Palpate the tip of the right thumb with tip of the index finger of the left hand (C); with the tip of the left thumb palpate the niche between the proximal ends of the proximal phalanges of the first and second fingers of the right hand (C), the tip of the thumb resting slightly distal to the knuckles of the right hand (metacarpophalangeal articulations of the index and middle fingers). When this spot is noted the first maneuver is complete. In the second maneuver, bring the palmar surface of the left index finger to rest on the back of the right hand over the space between the second and third metacarpal bones (D). With the tip of the left index finger palpate the niche between the knuckles of the index and middle finger and slightly beyond. While so doing, slowly extend the index and middle fingers of the right hand; as they go from full flexion to full extension the palpable niche becomes quite shallow. Thus most of the sensations usually experienced in palpating the sacral hiatus are transferred to the tip of the left index finger. The knuckles represent the two sacral cornua, the web between the fingers represents the sacrococcygeal membrane (A and B). The point palpated in the first maneuver by the tip of the thumb (C) and in the second by the tip of the index finger (D) represents a point overlying the entrance to the caudal canal.

understanding of this step in the technic (Fig. 1).

About 5 cm. proximal to the tip of the coccyx, a small wheal is raised in the skin, and one may proceed with the injection, which is usually accomplished readily if this primary wheal is properly located and raised. A common mistake in locating the primary wheal is either to make it to one side of the median line posteriorly or too high in the median line. By palpating the tip of the coccyx after the method illustrated and noting a point a short distance above it, one is more likely to avoid making the wheal too high. The skin wheal is more easily made and less pain is inflicted if the bevel of the needle is pressed against the skin and into superficial layers. This is the reverse of the method usually employed. Throughout the procedure procaine solution is forced through the lumen. Figure 2 illustrates the procedure of raising the wheal in the skin. The short wheal needle illustrated is a source of very little back pressure to the advancing plunger of the syringe as compared with the long wheal needles in general use.

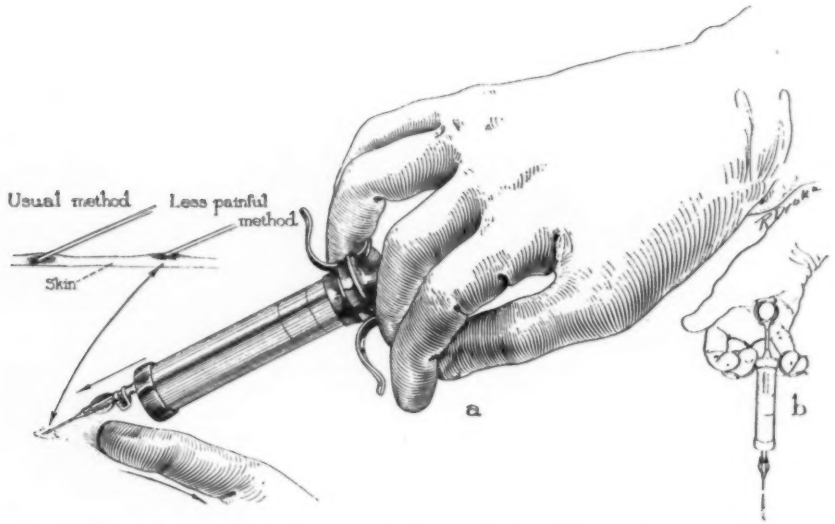

Fig. 2. A, Raising a wheal in the skin. The syringe is held in the middle of the right hand with the plunger against the thenar eminence, the offset nipple upward, the bevel of the needle down, the index finger of the left hand on the skin beneath the barrel of the syringe and pressing the skin toward the needle. Solution is forced through the needle continuously from the time the bevel almost reaches the surface of the skin until the wheal is raised. B, Palmar view: solution being forced through a very short wheal needle.

PRELIMINARY INJECTION INTO THE TIP OF THE CAUDAL CANAL

A needle 50 mm. long and of medium caliber is next attached to the syringe and the point is inserted through the primary wheal and through the sacrococcygeal membrane into the caudal end of the sacral canal. The wheal is immobilized by pressure with the left index finger and the point of the needle is guided into the sacral hiatus (Fig. 3). Five cubic centimeters of procaine solution is now injected and the syringe detached, the needle remaining *in situ* (Fig. 4A). The 50 mm. needle serves as an indirect guide for the introduction of the caudal needle. It has been recommended that the needle be left *in situ* while the caudal needle is being inserted.[10,11] I prefer to remove the 50-mm. needle (Fig. 4B), and insert the caudal needle in its stead.

INSERTION OF THE CAUDAL NEEDLE

The caudal needle is grasped between the thumb and middle finger of the right hand, the index finger pressing the stilette into the needle. The left index finger is again returned to the median line and

the tissue is immobilized as in Figure 3. The 50-mm. needle is grasped between the right ring and little fingers and withdrawn and dropped; one must not glance away from the primary wheal (Fig. 4B). The caudal needle is thrust through the perforation made by the 50-mm. needle, the bevel of the caudal needle being kept (Fig. 4B). It is especially advantageous to press the tip of the left index finger into the fossa between the sacral cornua in order to depress the point of the caudal needle and force it into the sacral hiatus (Fig. 4B). The caudal needle is advanced into the caudal canal until its point comes to rest at the level of the second sacral

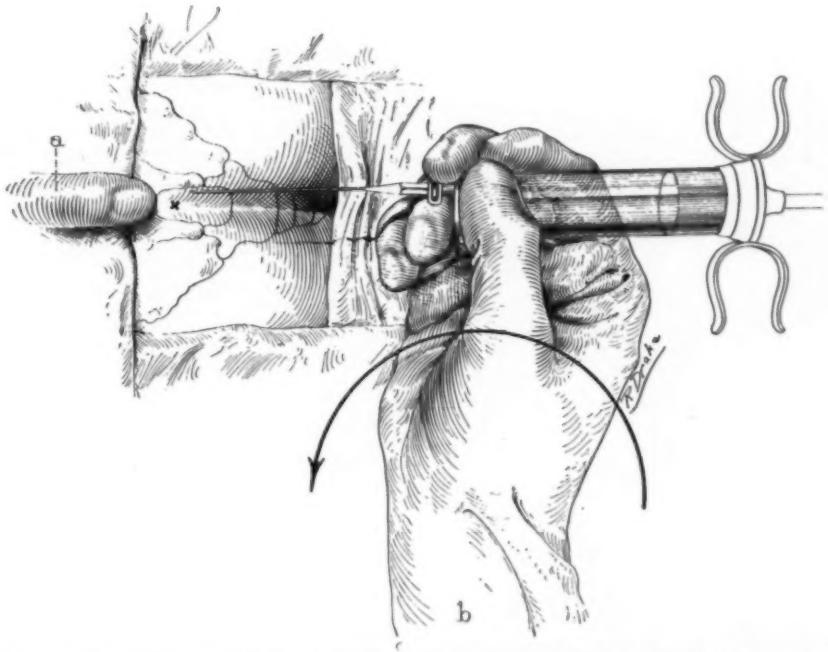

Fig. 3. Introduction of the 50-mm. needle. A, The left index finger. B, Right hand holding syringe and 50-mm needle. X, The spot through which the needle is to be thrust.

upward until bone is reached. It is then rotated by the thumb and middle finger, the index finger holding the point gently against bone. After the bevel has thus been brought against the bone, the hilt of the needle is depressed and the point advanced through the sacrococcygeal membrane into the caudal canal. When bony resistance is encountered at points low in the caudal canal the caudal needle is given a half turn (180°) and again advanced. The object of rotating the needle is to bring its bevel against the bony obstruction so that the needle will override it. With the left index finger one may massage the soft tissues overlying the sacrum and frequently facilitate the upward movement of the caudal needle when it apparently becomes lodged in the sacral canal foramen. It is desirable that the point of the needle be brought as nearly as possible into the center of the caudal canal, that is, in the center of all its diameters. One may estimate how high the point of the needle lies in the canal by measuring with the stilette of the needle against the skin posterior to the sacral spines. If the point of the caudal needle seems to rest against bone, it is well to withdraw it slightly. If blood is observed when the stilette of the caudal needle is removed, one may be quite sure that the plexus of veins which lines the bony canal has been punctured. Obviously intravenous injection results if the point of the needle lies in this plexus. A small hematoma may form in the caudal canal. It is said that the tip of the dural sac usually extends

to the level of the second sacral foramen, and in a few instances I have obtained spinal fluid with the caudal needle at various levels, usually lower than the second sacral foramen, and have produced spinal anesthesia. If spinal fluid appears, the needle should be partially withdrawn so that its point lies well below that of the

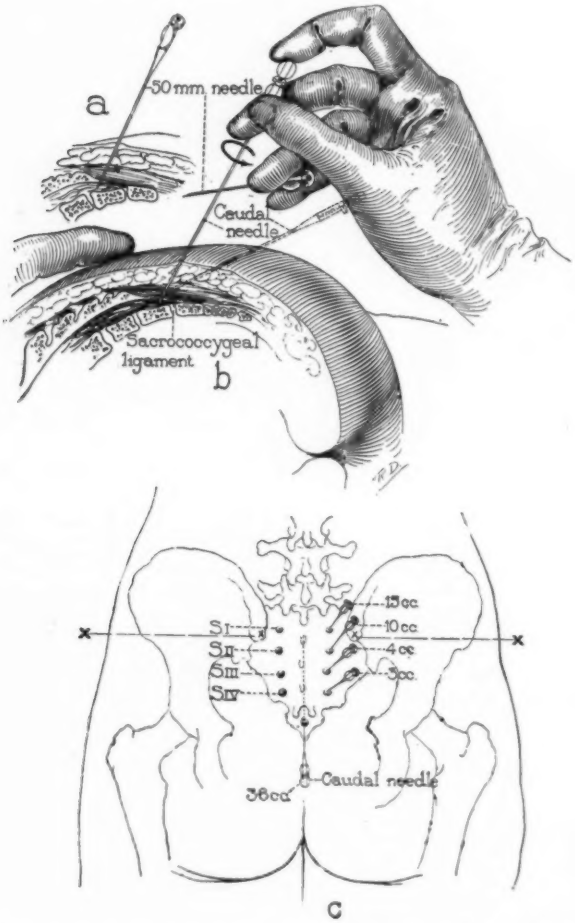

FIG. 4. A, A 50-mm. needle is inserted through a wheal over the sacrococcygeal membrane into the tip of the caudal canal and 5 c.c. of solution injected to make the insertion of the caudal needle painless. B, The 50-mm. needle is withdrawn and the caudal needle inserted in its stead and advanced into the caudal canal, after being rotated so that the bevel rests on bone. C, Dorsal view of sacrum with caudal needle in position as well as those in SI, SII, SIII, and SIV (the first, second, third, and fourth sacral foramina). A total of 36 c.c. of solution is placed in the caudal canal in the average case.

dural sac, and a small amount, 5 to 10 c.c., of 1 per cent solution may be deposited in the bony canal. The principal part of the block should then be attempted by transsacral technic.

INJECTION INTO CAUDAL CANAL

If no blood or spinal fluid appears when the stilette is withdrawn from the caudal needle, the syringe, not quite filled with procaine solution, is attached to the needle and gentle aspiration performed, first as the needle lies, and again after it has been given a half turn (180°). If no blood or spinal fluid appears on the first two aspirations, 0.5 c.c. of solution is injected through the caudal needle and aspiration is repeated. If still no blood or spinal fluid appears, injection is continued very slowly so that the progress of the plunger through the length of the syringe is hardly perceptible. Twenty cubic centimeters of solution is injected through the caudal needle, and this with the 5 c.c. already injected through the 50-mm. needle brings the total thus far deposited in the canal to 25 c.c. All the while that solution is being injected into the caudal canal through the caudal needle, the tissue posterior to the sacrum is palpated. If solution is injected on the posterior surface of the sacrum there should be tumefaction or at least back pressure against the advancing piston. When solution is being injected into the caudal canal under slight pressure respiration increases in depth and occasionally the patient sighs. This should occur, however, only at the time that pressure is being exerted, so that by bringing the plunger to a standstill and observing respiration and then advancing the plunger one may distinguish between the usual depth of respiration and that under pressure. Signs which indicate whether or not solution is being injected into the caudal canal are discussed elsewhere.[34]

It is now assumed that the caudal needle has been inserted into the caudal canal, that the point of the needle lies at a satisfactory point between the level of the fourth and second sacral foramina, and that a total of 20 or 25 c.c. of solution

has been deposited therein. The injection of the balance is postponed until after transsacral block. As a rule, good anesthesia of the sacral nerves may be induced by a caudal injection only if 30 or 35 c.c. of procaine solution at body temperature has been injected and allowed to penetrate the nerve trunks thoroughly for a period of from thirty to forty-five minutes. Not infrequently anesthesia may be unilateral or incomplete and it may be necessary to inject the first four sacral foramina posteriorly. Data relative to the use of caudal injection and caudal injection plus that of the sacral foramina for various procedures and types of operations have been offered previously,[31,34] and need not be repeated here, except to emphasize that one should be prepared to carry out complete posterior sacral block whenever one undertakes the anesthetizing of the sacral nerves.

TRANSSACRAL BLOCK

In discussing transsacral block, I have found a manual teaching exercise useful to illustrate the relationship of landmarks to be used (Figs. 5 and 6). In an obese subject the area immediately over the posterior superior spine will be represented by a dimple, in a thin subject it is very easily palpated, and in the average subject it may be palpated by gentle pressure. If considerable pressure is used, bone will be palpated in many places and the spinous process become confused with points on the edge of the ilium. Wheals are now raised in the skin over the second, third, and fourth sacral foramina which underlie a line about a finger's breadth lateral to the median line and at the following intervals: the second at a point near the posterior superior spine, about a finger's breadth caudad and mesial to the spine, the third about a finger's breadth below the second, and the fourth a finger's breadth below the third. In a large subject the foramina will be separated from each other and from the median line by a space corresponding to a large finger's breadth and in smaller subjects by a small finger's breadth. It is of distinct advantage to make the wheals in the skin slightly lateral to the sites directly overlying the foramina for, if the needles are inserted through wheals which are too close to the median line, those on the opposite side cannot be retracted laterally because the skin will not stretch. However, a wheal raised laterally to the line overlying the foramen may easily be pushed toward the

Fig. 5. Manual teaching exercise for locating the sites where wheals are to be raised over the second, third, and fourth foramina and sacral hiatus. The dot x is over the head of the ulna and corresponds to the posterior superior iliac spine. The broken line represents the posterior median line of the sacrum. The thumb of the right hand represents the coccyx as in Figure 1. The solid line represents a line overlying the second, third, and fourth sacral foramina and lies about a finger's breadth from the median line and about a finger's breadth from the dot x. The fingers of the left hand are resting on the sites where wheals are to be raised as represented by three small x's on the solid line and a small x at the end of the broken line. The fingers of the left hand are separated from each other by about a finger's breadth so that one may mark off from above downward the approximate positions of the second, third, and fourth sacral foramina and the site for the primary wheal. This maneuver completes those illustrated in Figure 1 and makes it possible to check the probable location of the primary wheal from above downward and from below upward; it is my practice to do both before raising the primary wheal.

median line. A needle may be broken off in the foramen if too much lateral traction is exerted on it when the skin through which it has been passed is put under tension. Figures 5 and 6 illustrate how one may confirm the probable location of the primary wheal from above by placing drops of solution on the skin where one intends to raise the wheals over the second, third, and fourth sacral foramina. The fifth sacral foramina occur a finger's breadth below the fourth and at a point opposite the usual site of the primary wheal for injection of the caudal canal. After the second, third, and fourth sacral foramina have been located, a wheal is raised a finger's breadth above the second on each side and the first sacral foramina are sought. The second, third, and fourth sacral foramina on the left side are injected while the anesthetist stands by the patient's left hip; those on the right are injected while the anesthetist stands at the patient's hip. The last needle to be placed is the one which is inserted in the first foramen on the left side, after the first on the right side has been injected and the anesthetist has returned to a position by the patient's left hip. The object of leaving the first foramina until the last part of the injection is to take advantage of any anesthesia which may develop in the lower sacral nerves from the injection of procaine through the caudal needle. The fourth sacral foramina may be injected almost painlessly after the caudal injection, the sensitiveness increases with the other injections, the injection of the first foramina being the most sensitive of all. The quantity of solution injected into the foramina is as follows in the average case: 3 c.c. in each fourth sacral foramen, 4 c.c. in each third, 10 c.c. in each second, and 15 c.c. in each first. After all the foramina on each side have been injected, an additional 5 or 10 c.c. of solution is injected into the caudal canal. The needles and the quantity injected through them are shown in Figure 4c. In the case of a weak patient it is often advantageous to inject half the amount of solution intended for each foramen as soon as the needle is placed, and the balance after all the needles have been placed and just before each is

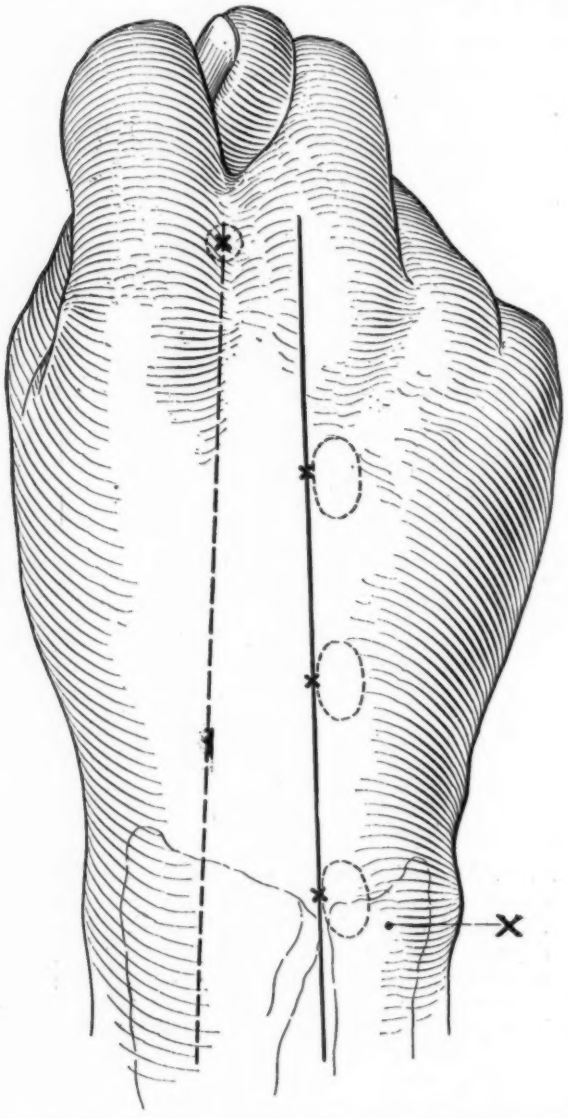

Fig. 6. The dot x represents the same structure as in Figure 5. The x within the circle at the end of the broken line represents the spot where the primary wheal is to be raised. The x's on the solid line represent from above downward the sites of the second, third, and fourth sacral foramina; the small circles in the broken line represent the sites which were pressed upon by the tips of the fingers of the left hand in the maneuver in Figure 5 and also represent the sites for the skin wheals. As is explained in the text, it is of advantage to raise the wheals slightly lateral to the site which overlies the mouth of a foramen, since skin may be readily moved toward the median line but cannot be moved easily in the opposite direction once the needles have been placed in the foramina on the opposite side.

removed. Each needle is watched and aspirated for blood or spinal fluid as has been described for the caudal needle. I have obtained spinal fluid once from the first left and once from the second left sacral foramen. In such cases the position of the needle should be shifted until blood or spinal fluid is no longer obtained. It is essential that the point of the needle be advanced halfway through each foramen. The desired depth of the point of the needle may be estimated by advancing the needle through the skin wheal and bringing the point to rest against the posterior surface of the sacrum; the length of needle remaining above the skin is measured in finger-breadths; the needle is then advanced into the foramen so that the part above the skin is shorter by a half finger's breadth than when first measured.

As soon as injection is completed, the perineum in the median line posterior to the anus is tested with a needle and, if anesthesia or analgesia is present, the needles in the sacral foramina may be removed and the patient placed in position for operation. Hyperesthesia is frequently the first change noted and occurs in the area which later becomes anesthetic. Anesthesia may be expected within ten or fifteen minutes after injection has been completed; it becomes intense in twenty or thirty minutes and lasts for one or two hours.

If the canal cannot be located, twice the usual amount may be injected into each foramen and good anesthesia be produced without a caudal injection.

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PREOPERATIVE AND POSTOPERATIVE SURGICAL TREATMENT

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SUCCESS in surgery depends largely upon the observation of details, careful examination of the patient with reference to both local and general condition, and the strict preparation prior to the operation whenever possible. In the art of surgery the master word is simplicity.

Where emergency does not contraindicate, conditions would all be improved if a period of complete rest, both mental and physical, with pleasant diversion, moderation in food, reasonable exercise and freedom from worry and responsibility could precede all operations of consequence. Unquestionably some overfagged patients are particularly helped by spending two or three days in bed before operation, eating lightly and sleeping plentifully and peacefully.

It is rather a frequent incident for surgeons to have little patience with the anxiety and minor problems of patients in advance of operation. It has been my conclusion that these are the very men who, in all likelihood, would not more gracefully submit to the same ordeal themselves, and who would only too gladly welcome the comfort and utmost consideration in their own whimsicalities.

While some patients, probably the majority of them, are better prepared by lying quietly in bed and resting and sleeping for two or three days in advance of operation, others are rendered unnecessarily nervous and apprehensive by this unusual form of life; such patients, who are usually of the robust type, may be better prepared by allowing them more latitude, while at the same time simplifying their lives, letting them walk about, interest themselves quietly, take their own preliminary bath and so forth.

The patient's chief resources upon entering the operating room are his constitutional powers and his resistance, reinforced by cheery bravery, and everything possible should be done to increase these.

A general physical examination should be made in detail on every patient undergoing an operation of consequence. Careful examination should be made of the blood in all cases of acute and chronic infection, in anemic cases and in cases of marked hemorrhage. When indicated, the coagulation point of blood and the hemoglobin percentage should be known in advance, and when these are distinctly below normal the operation should be postponed if possible or performed with great caution, if in emergency. When it is indicated, the blood pressure should be taken, as no operation should be undertaken by choice during high blood pressure, if there is any chance of its reduction; in the same manner, the low pressure should be taken care of.

The underfed patient should be liberally nourished until brought to the requisite standard or to a standard which is compatible with operation, unless, again, it is in an emergency. The overfed, to whom the majority of the non-invalid class belong, should be correspondingly dieted sufficiently to relieve them of their overloadings.

The only needed restriction as to meals taken up to within thirty-six hours of the operation is: they should be somewhat lighter (less in amount) and more digestible (simpler) than usual. While light, nourishing, digestible diet can be taken up to the day before the operation, all nourishment should be stopped six hours before. If any part of the gastrointestinal tract is to be the site of the operation, an antiketonic diet as worked out by Matas is of value and should be prescribed for the last two or three days.

When the bowels are to be purged, it should be fully accomplished well in advance of the operation, so that there shall be no chance of its interfering. The tendency to too great purgation and saline catharsis has existed in the past; such a course may be harmfully depressive and dehydrating. Some operators advise the administration of different purgatives the second day before the operation, but in my experience, rather than take any chances on having the bowels act during operation, an enema alone should be given early in the morning of the day of operation, although of course its action is more local than a mouth purgative.

A prolonged, warm, full tub bath with a soap scrub is given, when possible, the day before the operation, including the entire head, as well as all mucous membranes which open on the skin, together with care of the finger and toe nails, and especial care of the mouth and teeth.

It is well to plan for the patient to have before the operation at least two or three hours of absolute quiet, undisturbed by any detail of preparation for the operation, with the time spent preferably in sleep.

The precaution taken before the operation to disturb as little as possible the daily routine favors a more rapid and easy convalescence.

The bladder should be emptied just prior to going to the operating room, preferably voluntarily. Catheterization should be performed only when voluntary micturition is impossible.

I am not at this time going into the preparation of the skin of the operation site, except to say that it has been our conclusion at The Bayside Hospital, where we have tried out the various techniques of preparation, not to disturb the skin with various antiseptics and applications. The night before it is to be shaved well beyond the operative area, being careful to avoid cuts. After the patient is on the operating table the area is cleansed first with ether to remove all grease, then a 3.5 per cent solution of iodine is applied and the field is ready. We have found this simple method very satisfactory in all cases.

PREVENTION OF POSTOPERATIVE COMPLICATIONS

Among the postoperative complications which we must consider from a preoperative standpoint are the pulmonary. Different methods have been suggested for the prevention of these complications. Some authors have satisfactory results with respiratory exercise, inhalation or other physical procedures. Others have tried to improve the pulmonary ventilation by stimulating the activity of the heart by means of digipuratum, or injections of 10 per cent solution of grape sugar. Furthermore, injections with afenilin, optochin and lecithol, intramuscular ether injections, as well as prophylactic pneumococcus vaccination. A new preparation, Mentophin, was tested by H. J. Willerding, with regard to its prophylactic and therapeutic effect. Mentophin contains 1 per cent of thymol, 3 per cent of menthol and 96 per cent of terpichin.

The patients receiving the usual preparatory treatment, consisting of an injection of 0.5 gm. of veronal the evening before the operation, or an injection of morphine and atropine, or morphine and scopolamine thirty minutes before the operation, were injected immediately after the intervention with 2.2 c.c. of Mentophin intragluteally, and the same dose was administered on each of the next two days.

These injections had no local or general reaction and were not painful. Young patients generally received only one injection immediately after the operation provided they had not previously had bronchitis, grippe or angina; the patients over fifty received two injections and sometimes three. The idea is that in cases where the patient might be expected to have some pulmonary complications this method is always indicated, and the conclusions are that although Mentophin is not an absolutely sure prophylactic remedy against

postoperative pulmonary complications, it considerably reduces the mortality and has favorable influence upon the course of the complication, should it appear.

In cases of vaginal operation or when the vagina is to be invaded during an operation, a douche of tincture of Green soap, ½ oz. to 1 quart of sterile water, should be given, followed by 1 quart of 1:5000 bichloride of mercury solution, then by 1 quart of normal salt solution.

Starling has advanced the belief that by preoperative purgation of the drastic sort, less used now than formerly, the important hormone, "secretin," which activates the pancreatic enzymes and acts as a stimulant to bile secretion and succus entericus, is largely removed. This leads to an abnormal intestinal digestive function and the production of acid bodies in excess of the deranged fat metabolism.

The condition of "recurrent vomiting," so called, in children is well known and its relation to an acidotic state substantiated. Conditions demanding surgical intervention are frequently accompanied by vomiting of various degrees so that vomiting itself becomes a factor in favoring an acidotic state.

Preliminary starvation of more than six to eight hours' duration leaves little for the normal processes of digestion to work upon and would call for a mobilization of the liver-stored glycogen and its use for body energy. After this has been exhausted or nearly so, incomplete or abnormal fat metabolism would occur. Under normal conditions in the presence of or contemporaneous with carbohydrate metabolism, little more than 5 per cent of fat escapes absorption. Following starvation, after stored sugar has been used, fat is called on, but its metabolism is imperfect because of the diminished carbohydrate. It is well known that preoperative infection is likewise a factor in favoring acidosis.

Crile has demonstrated that asphyxia which leads to suboxidation is in itself a cause of acid intoxication.

In view of the above it has been our policy at The Bayside Hospital as a routine, in cases of extreme emaciation, or where the patient is starved or dehydrated on account of inability to take food or water for any reason prior to operation, and in cases where the urine shows diacetic acid after operation, to give a 5 per cent solution of sodium bicarbonate and 5 per cent solution glucose rectally by the Murphy drip method, care being taken not to irritate the rectum.

In giving a narcotic prior to operation the time element plays an important rôle. Morphine begins to be effective in not less than fifteen to twenty minutes after hypodermic injection, and its effect rises or intensifies rapidly until about forty-five minutes, then more slowly until the peak is reached in about one hour. This is the ideal time for the anesthetic to begin.

When a loss of consciousness is desired (amnesia to preparation), scopolamine and morphine are combined by some. My objection to this combination is that there is a depression of respiration following scopolamine and morphine to the extent of the rate dropping as low as eight per minute. Thorek, however, states that there are no deaths due to this method.

The synergistic action of magnesium sulphate has been made use of but a few years, although the discovery which led to its use was made in 1915. The late S. J. Meltzer of the Rockefeller Institute, while experimenting for other purposes, noticed that two drops of a 5 per cent solution of magnesium sulphate injected intracerebrally in a rabbit produced complete anesthesia and relaxation lasting several hours. Repeated attempts, however, to use magnesium sulphate as an anesthetic agent demonstrated its ineffectiveness. Its combination with morphine, first suggested by E. J. Pelliric of the Pharmacologic Department of the University and Bellevue Hospital Medical College, was worked out and the effects determined in association with J. T. Gwathmey. Clinical results at the Presby-

terian Hospital showed that this combination increased the value of morphine from 50 to 100 per cent. Rector explains the action of the magnesium sulphate by saying that magnesium sulphate is a powerful medicine in hastening the absorption of morphine and probably also retards the formation of the oxide-morphine, which is produced by the process of oxidizing the morphine in the body. The details of this combination and administration I shall not go into at this time. Other things being equal, a preoperative narcotic shortens the time of induction and lessens the amount of anesthetic used. It is claimed that if the morphine is combined with magnesium sulphate solution it still further shortens the time of induction and gives a smoother anesthesia and decreases the amount of the anesthetic.

It has been our practice at The Bayside Hospital, unless contraindicated, to give morphine, grain $\frac{1}{6}$ and atropine, $\frac{1}{150}$, thirty minutes prior to the administration of the anesthetic. We have observed that the induction is short and the anesthesia smooth, with recovery in a remarkably short period, and nausea and vomiting a very negligible quantity.

POSTOPERATIVE CARE

The great importance of the after-treatment in abdominal surgery becomes evident in the vast majority of cases through the most harmful complications during the convalescence of the patient. This subject has always aroused considerable attention and interest and deserves serious consideration, since a considerable number of patients succumb as a result of irrational therapeutic measures. The fact cannot be emphasized enough, that rational and systematic after-treatment has to be regarded as being as important as a well-performed operation itself. In many cases the surgical intervention is disproportionate to the severity of the intercurrent complications. It often occurs that though the immediate results of surgical treatment are excellent, the end-results are far from ideal. The last few years of clinical investigations and experiences in some of the large hospitals have revealed many valuable methods of greatest importance serving to prevent and combat postoperative complications and thus to secure uneventful recovery for the surgically treated patient.

In approaching the postoperative care it is advisable for us to consider the conditions which usually arise following a laparotomy, and to establish a treatment which will to a large extent prevent these conditions from arising, rather than to wait until they are well established and then consider their treatment.

Patients who have been operated upon for goiter, lesions of the stomach or duodenum, including gastroenterostomies, resections and plastic operations, should be placed in bed in a semi-sitting posture at an angle of about 45 degrees, and this position maintained for several days. This applies also to patients operated on for infection of the lower abdomen and pelvis in which drainage is used, and in prostatectomies, and in the aged in general unless otherwise indicated. All other cases may be permitted to assume such posture as may be most comfortable, but too frequent change of position should be discouraged.

In postoperative shock, experience shows us that the results obtained by glucose intravenous infusion are superior to those obtained by saline, because the intravenously infused salines considerably lower the resorption power of the peritoneum. Here again we find insulin subcutaneously of value, giving 1 unit of insulin for every 4 gm. of glucose. In severe cases camphor in oil plays a major rôle. Of course it goes without saying that heat and rest are always used.

From time immemorial opium in some of its forms has been given for postoperative pain, and it does temporarily relieve the pain; but one must stop and consider that opium has many more physiological actions, some of which are highly undesirable, the three principal ones being that it

stops peristalsis, stops secretions and produces nausea. It has been our experience at The Bayside Hospital that 90 per cent of the cases of simple so-called postoperative pain can be effectually relieved with a combination of aspirin and aromatic spirits of ammonia, thereby avoiding all of the undesirable action of opium. Many operators relieve gas pains by morphine. This, in my opinion, is a very undesirable practice because of the retarding effects of morphine on peristalsis. I would prefer the aspirin and aromatic spirits of ammonia method, as this is effective in 95 per cent of cases.

Many cases which do not present any unusual features at the time of operation may develop most serious complications at its inception. It is especially wise to ascertain whether a circumscribed focus can be found, which may be responsible for all disturbances. The roentgen ray and the laboratory play a most important part in the detection of concealed foci. The wound itself should have a careful examination. In any case when we have tenderness, slight rigidity of the recti muscles, along with continued temperature and leucocytosis, intrabdominal abscess may have been overlooked at the time of operation, such as a subphrenic abscess or a subdiaphragmatic abscess in the pouch of Douglas (retrovaginal abscess). The treatment is too well known to mention here, once the diagnosis is made. Pyelitis and pyelonephritis as a postoperative complication are not rare, although commonly overlooked, and should be thought of at this time.

Postnarcotic emesis is undoubtedly due to a pneumogastric reflex action produced by the swallowing of saliva containing more or less chloroform or ether. This condition is handled by various operators in various ways. Some give $\frac{1}{60}$ grain of atropine followed immediately, postoperatively, by $\frac{1}{6}$ grain of lobeline, both being given hypodermically. Another method is an immediate gastric lavage with 3 per cent warm sodium bicarbonate solution or 2 per cent sodium chloride. These two methods have both given excellent results. I find that the giving of $\frac{1}{150}$ grains of atropine with my preoperative narcotic is usually sufficient to prevent any serious postoperative emesis.

Gastric lavage is practically effective in 97 per cent of all cases of postoperative thirst. This condition is brought about in long operative cases and is caused by loss of blood and perspiration during the procedure. It can be controlled largely by the administration of a slightly hypotonic glucose solution. I think this is due to the rapid absorption of hypotonic solutions and the concentration of salts in the dehydrated tissues. This I believe to be the chief reason for giving the glucose in preference to salt solution, as the salt would only add to the concentration of the salts and thereby increase the thirst.

Postoperative treatment is of great importance in surgery of the digestive tract, especially for the first week. At times one encounters some difficulty in administering sufficient fluids, when the stomach will not retain it and the rectum returns it. Blood transfusion and intravenous infusion, as we know, have only a transitory effect. Crawford H. deLisle has advanced a method of handling this condition by means of a stab wound through the right abdominal wall about 2 inches internal to the right anterior superior iliac spine at the level of the base of the appendix. The appendix is delivered through this wound and there fixed and is severed $\frac{1}{2}$ inch from the skin. Then a small catheter is introduced into the lumen of the appendix and liquids are administered by this route. He claims that by this method he never has any trouble with the stump of the appendix after its period of usefulness has passed, that the pulse is rapidly returned to normal, peristalsis is stimulated, the blood pressure is raised, the patient is fed without disturbance and the stomach is allowed to rest.

I have never used this technique and

do not think that I shall, as it appears to me that these cases, while they do occur, are in the minority by far, and unless one could be absolutely sure of this complication arising the cost of the game is not worth the playing.

The much-dreaded acute gastric dilation is not infrequent after abdominal operations, usually appearing in the first two or three postoperative days, and if it is not recognized and properly treated, will undoubtedly result fatally. The usual clinical picture is one of continuous vomiting, without effort, of large quantities of brownish, sometimes tar-like and almost odorless liquid; it is accompanied by sweat, rapid pulse and extreme prostration. In many cases the upper abdomen shows a well-marked distention, but it must be remembered that there are cases with absence of noticeable distention of the epigastrium. In this latter form the diagnosis of acute dilation is very difficult to make unless this possibility is always kept in mind. In such doubtful cases the continuous vomiting accompanied by unquenchable thirst and restlessness will clear up the diagnosis. When this complication arises probably the best procedure is immediate and thorough gastric lavage with 2 per cent sodium chloride. Some authors lay large stress on position, such as the deep Trendelenburg position or knee-chest position, their theory being that the beneficial effect of these positions is due to relaxation of the over-stretched mesenterium and to the relief of the obstruction.

In the avoidance of postoperative paralytic ileus the most important factor is prophylaxis, which should begin on the operating table, consisting of careful handling and protection of the bowels from injury. A hypodermic injection of ½ to 1 c.c. of pituitary extract should be given every one or two hours for the first six or eight hours after operation. Pituitary extract in these early postoperative hours, besides stimulation of the peristalsis, as a triple beneficial action increases the blood pressure, improves the blood circulation in the lungs, and stimulates the urinary bladder. If the obstruction is due to cessation of the peristalsis and the usual therapeutic measures are not efficient, large doses of 3 or 4 mm. of eserine, if intramuscularly given, are of great value. In the extreme cases the early performed enterostomy provides good results, with hypodermoclysis of 1000 c.c. of 3 per cent sodium chloride solution given twice daily to control the toxemia caused by the obstruction. It is well to remember here that the appearance of a dry tongue, rapid pulse, distended abdomen and nausea does not always indicate a generalized peritoneal infection, since these symptoms are also present in a simple paralytic obstruction.

The difference of localization and duration in the simultaneous appearance of emphysema and suppuration is evidence against the identical origin of the two phenomena on an infectious basis.

The etiology of postoperative abdominal emphysema in general surgery has not been clearly explained. According to H. Freund, subcutaneous abdominal emphysema is rarely seen in convalescence after colectomy. The earlier assumption that air penetrates during the operation is not impossible, yet it is more probable that the supposition that anaerobic bacteria, which have been enclosed, are the cause. Gas gangrene with its characteristic livid, gray-green discoloration of the skin and soft crepitation upon palpation, especially in wounds from splintered shells, was of common occurrence on the battle field. The clinical symptoms alone leave no doubt that a serious, rapidly-progressing wound infection is present. The direct infectiousness of the disease, which makes strict isolation imperative, has been satisfactorily proven.

Traumatic emphysema in surgery has long been recognized and has been attributed to active sucking in of the muscles or fascia. Subcutaneous emphysema, which comes about after injury to

the pleura and lungs with or without pneumothorax and which is often of extensive development, is also well known.

A summary of reported cases would indicate that gas-forming anaerobic bacteria of pathogenic nature are inclined to be latent, limited affections where they lack their favorite substratum. Bacilli coli as well as the anaerobic streptococci and staphlococci are never found to be the inciting cause of emphysema of the abdominal walls.

As to acute retention of urine, it must be borne in mind that in a number of these cases the previously given morphine is responsible for the cause, which can be quickly relieved by the application of a hot waterbottle to the bladder region and the subcutaneous injection of pituitary extract. Catheterization should be used only as a last remedy, since all patients with lowered resistance are inclined to infection, and cystitis and ascending pyelitis of exogeneous origin are not rare occurrences.

The reported success of several authors with extravenous injections of urotropin and cylotropin solution in the treatment of postoperative retention of urine suggested this method to Krieger; of the two drugs she favors cylotropin and prefers to administer it in the first six postoperative hours.

In females as well as in males after an operation, especially upon generative organs, there is sometimes difficulty in voiding, thereby adding unpleasant complications. This in the first place may be due to the simple fact that the patient is unable to void in a recumbent position, so it is well, if time permits, to accustom the patient to void in this position prior to the operation. Other causes of this condition are injury to the bladder wall, and pain caused by the urine coming in contact with the wound, which may also discourage the patient from permitting the passage of urine. The common treatment for this condition is the oral administration of diuretics, but this is not always found to produce satisfactory results. The routine resort to the catheter is not always wise, as it may result in cystitis in some conditions, regardless of how unimpeachable the technique may be. It has been found however by Heinz Kustner that the intravenous injection of a 40 per cent solution of urotropin affords relief in such cases. He does not administer this immediately after the operation, but rather waits for spontaneous micturition, as it has been found that urotropin given intravenously immediately after an operation on an empty bladder will produce an irritation of the mucous membrane of the bladder, and even hemorrhage and tenesmus. The acceptable time to give this is the evening after the day of the operation. At this time, if no voluntary micturition has occurred and you know that the bladder is full or distended, then give 5 c.c. of a 40 per cent solution of urotropin intravenously, and usually spontaneous micturition will follow shortly after the injection. However, it is only with the exceptional case that we have any difficulty at The Bayside Hospital.

Postoperative bronchitis and bronchopneumonia are now treated through the synergistic action of atropine and lobelin mentioned above, and their intercurrence is becoming rare. As a large portion of postoperative bronchitis and bronchopneumonia cases are caused by hypodermoclysis given in the chest, the abdominal type of respiration is, after abdominal operations, considerably suppressed and the thoracic type becomes more prevalent.

The painful hypodermoclysis given in the chest, results in the impairment of the thoracic breathing with consequently shorter amplitude of respiration, thus causing an insufficient ventilation of the lungs and giving rise to pulmonary affections. For this reason hypodermoclysis, as a rule, should be given in the outer surface of the thighs.

Not uncommonly in cases of chronic appendicitis, the type associated with constipation or ptosis, acetonuria is found.

In those cases with stasis on the one hand and with a general large bowel sluggishness on the other, toxic agents are produced which have a relation to increased acid-body production.

Regarding the importance of a postoperative complication, it becomes necessary to the surgeon to forearm against it; means for so doing are suggested in the causes themselves. Excessive purgation and prolonged starvation should be interdicted. Morphine and atropine should be used sparingly.

In toxemia cases, i.e., cases of chronic appendicitis, for example, or ptosis, patients often show acetonuria. Crile showed that in various types of autointoxication the toxic agent produced an increased activity of the adrenals and increased adrenalin. In keeping with deductions concerning the role of the sympathetic in operations, the increased adrenalin in autointoxication might indirectly affect pancreatic secretion.

Two factors not readily controlled are, first, infections of the organs of surgical attack and, secondly, manipulation. The latter can be minimized to a large extent, depending on the skill of the operator, by injection of abundant fluids to dilute the toxins in infectious conditions and hasten their excretion, thus mitigating this as a factor in excess acid production.

While I have not tried it, it would seem from the experience of others that it would be an excellent preoperative prophylactic measure to administer glucose and insulin together, especially in operations of the upper abdomen.

Hiccough is recognized as a clonic spasm of the diaphragm, sometimes involving only half the diaphragm. The conditions which develop hiccough are so numerous that it loses its value as a symptom. It may develop as a result of cerebral disturbance, of stimulation of the respiratory center, by venus blood, in uremia and acetonuria, and as the result of stimulation of the sensory fibers of the vagus and the sympathetic nerves.

Hiccough occurs most frequently in those cases in which the abdominal viscera and their peritoneal coverings are affected, and next in frequency in diseases of the brain and spinal cord. It is observed but rarely in diseases of the thoracic viscera.

Fatal hiccough is probably caused by alteration in the maternal blood. Its occurrence in infections is probably due to the absorption of toxins or the retention of metabolites. Hiccough after operations upon the abdominal viscera are usually reflex in character. The phrenic nerve contains centripetal fibers which may influence the respiratory center. The wider distribution of the phrenic nerve in the abdomen than in the chest accounts for the relative infrequence of hiccough in diseases of the chest and its frequent occurrence in diseases of the abdominal viscera. Hiccough occurs in diseases of the thoracic viscera only when the lesion is situated close to the points at which the fibers of the phrenic nerve are given off, namely, the root of the lung, the arch of the aorta, and the pericardium.

Operations on the gall bladder and the stomach are most frequently followed by postoperative hiccough. This occurs more frequently in men than in women, probably due to the lessened diaphragmatic excursion in women. It is more frequent in adults than in children, due to changes in breathing, and is a condition hard to control. Gastric lavage combined with morphine gives most frequent relief, sleep in these cases being positively essential.

The injection of the phrenic nerve with alcohol has been advocated, but this procedure should be reserved until last and then resorted to only to sustain the life of the patient.

In postoperative acute anemia, the general reaction of the human organism to loss of blood is very different. Sudden severe hemorrhage acts as a shock on the vasomotor center and cardiovascular system. The immediate restoration and sustenance of the necessary blood pressure without

causing any harm to the patient is a vital question and often encounters great difficulties.

Concerning blood transfusion, results are most satisfactory, but it must be borne in mind that in spite of careful preliminary tests and unimpeachable operative technique death may occur. Some authors prefer the direct transfusion over the citrate method, although it has been our experience at The Bayside Hospital that very satisfactory results have been obtained with the citrate method. The amount given with either method varies from 400 to 600 c.c., care being taken to avoid a dry cough (indicating acute cardiac dilation) and cyanosis (imminent hemolysis). Should either of these symptoms appear, the transfusion should be stopped and replacement of lost blood should be continued by infusion of indifferent solutions. Statistics show the mortality to be, with transfusion 2.7 per cent, without transfusion 6.6 per cent.

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SYMPOSIUM ON GONORRHEA

THE PRESENT DAY TREATMENT OF ACUTE GONORRHEA IN THE MALE*

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IN the successful treatment of acute gonorrheal urethritis, we have the key to the entire problem of gonorrhea in the male. It is obvious that if the acute infection is properly treated, there can be no complications and no chronic hangover. If one were to ask why we do not cure all of our acute cases, the answer would be that there is no single method of treatment which meets with universal approval. This is made evident by the innumerable methods of therapy which have been recommended for this condition. Still more to the point, however, is the fact that we cannot fore-tell how any given case will respond to a particular method of therapy. What is useful in one case might be distinctly harmful in another. This disturbing fact has led an English surgeon[1] to say that "the cure of gonorrhea is an act of God; the cases which one expects to do well do badly, and the cases which one expects to do badly do well." Nevertheless, in spite of the fact that our treatment of gonorrhea has been more or less empirical in character, much progress has been made within recent years; and in the short time allowed for this paper, some of the outstanding advances which have contributed to this progress, will be considered.

One of the cardinal errors in treatment is the tendency to seek a hasty cure of the acute infection; this leads to overtreatment, which in turn predisposes to trauma and eventual chronicity. The cure is the aim in view, not the time it takes to do it. In our zeal to hasten the cure, we are apt to cause much damage. Nature cannot be rushed. Any method of treatment to be effective must have one ideal in view, to eliminate the invading organisms without injury to the tissues. It is not necessary to kill the gonococcus outright; being an organism of low resistance, it can be destroyed by almost any chemical substance having antiseptic properties; the problem is to reach the deep-seated organisms and destroy them without at the same time damaging the tissues in which they are embedded.

When the multitude of methods and remedies is sifted down to those which have proved themselves of value, certain basic methods stand out preeminent. Internal medication is the oldest. The first man that was treated for gonorrhea undoubtedly took something internally. It is only a few years back that santal oil and other balsams constituted the first line of attack in acute gonorrhea. Modern therapy considers them not only useless, but actually harmful in the acute stage, though useful at times in the later stages. Because the gonococcus does not thrive in an alkaline medium and the patient is much more comfortable through frequent flushing of the urinary tract, an alkaline solution and the intake of much water constitute the most useful internal medication. Recent additions to internal therapy are neutral acriflavine in enteric-coated tablets, and pyridium, a substitution product of pyridine, which is said to destroy the gonococcus without injury to the tissues and without the aid of local therapy.

Local treatment aims to apply medica-

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tion to the affected tissues, and in this field our greatest successes and most striking failures have been achieved. We are prone to forget that the urethra is not a test-tube. It is in fact part of a living organism, sensitive to the slightest trauma, whether it be in the form of a bacterial invasion, a chemical substance or a surgical instrument. The urethra will not tolerate violence of any kind, however well-intended it may be. Anything put into the inflamed urethra acts like a foreign body; the stronger the solution, the greater the trauma and the greater the reaction. Any form of treatment which causes pain or irritation is distinctly harmful. Medication therefore should be the mildest possible consistent with effectiveness, not the strongest that the patient can tolerate.

Two forms of local therapy have survived the test of time, copious irrigations under hydrostatic pressure, and the local application of silver salts made with the small hand syringe. The Janet irrigation with potassium permanganate is the standard irrigation method, but it is not so popular as it was twenty years ago. Some men still advocate it. In his excellent book just published, Burke,[2] an English authority, denounces hand injection and favors hydrostatic irrigation. He says: "The patient is indeed wretched to whom treatment is meted out with a urethral syringe. It is the most dangerous and most abused instrument in the surgeon's armamentarium . . . The urethral syringe is almost a national danger." Strong words, but the identical language may be employed and has been, in favor of the hand syringe as against the irrigations. Every man to his own taste. I discarded the Janet irrigations in acute urethritis many years ago as being harmful, dangerous and less effective than the silver salts.

There can be no denying the cleansing value of warm fluid in large quantity flowing in and out of the inflamed urethra. But it is a dangerous procedure in the presence of an acute inflammation, especially in the hands of the careless and inexpert. The urethra is traumatized, the infection becomes more intensive and extensive, and complications are frequent. I believe that prostatitis and epididymitis are caused by the trauma of these irrigations as often as by any other cause. Moreover it has been shown by Kohnstamm and Cave[3] that fluid can be driven into the seminal vesicles by forced injection from the urinary meatus. And who can say that gonococci and other organisms are not carried directly into the seminal vesicles in this manner? This fact is considered by Sir John Thomson Walker[4] "a practical demonstration of the evil of applying high pressure in urethral irrigation."

Any stream of fluid which induces pressure against the urethral walls greater than that of the usual urinary stream, is a menace to the integrity of the urethral mucosa. This is exemplified by a report[5] of a postmortem examination in Prague made on a man who had been irrigated one hour previously with a 1:500 solution of potassium permanganate at a height of 1.65 meters (five feet). Microscopic examination of the anterior urethra showed splitting of the inflamed, friable mucosa in many places. I believe the Janet irrigations should be discarded entirely in acute gonococcal urethritis. I might add that they are of great value in the non-specific type of urethritis. More recently mercurochrome, acriflavine, collene and other preparations have been used for irrigation with varying success; but it matters little which chemical is employed, the dangers inherent in the method are the same.

Furthermore there is no reason for using this method when better results can be obtained with less danger of trauma and complications by the use of the silver salts applied with the small hand syringe. The particular silver salt to be selected is a matter of personal choice. If it is well chosen and properly administered, a prompt response will make that fact

evident; if the response is tardy or unfavorable, there is something wrong with the remedy selected or its administration, Many silver preparations are available and all have their advocates. My personal experience has been limited to protargol, argyrol, lunosol and more recently to a Czechoslovakian preparation known as neoreargon. All of these are valuable. The most striking results have come with neoreargon; the most consistently dependable with argyrol.

The successful use of the silver salts demands strict adherence to certain well-defined, but not always observed, technical principles. Silver solutions should be made fresh every day, otherwise they lose their efficiency and irritate the mucosa. A weak solution in the beginning of the infection gives better results than a strong one. As the case proceeds and the inflammation gradually subsides, the strength of solution may be increased, but never to the point at which the patient feels a sense of smarting or irritation. Treatment should be begun as soon as the diagnosis has been made, the earlier the better. Nothing is to be gained by waiting. The anterior urethra should not be distended with the fluid; it should be comfortably filled. By actual test it will be found that about one-third of the amount injected will enter the posterior urethra imperceptibly, thereby probably acting as a prophylactic against posterior involvement.

The patient should be seen every day and the urine, voided in two glasses, carefully inspected at each visit. This is extremely important, but many practitioners treat gonorrhea without ever seeing the voided urine. The amount of pus obtainable at the meatus is of little value in determining the progress of the case; but a clear urine in the second glass and a decreasing purulency in the first, constitute real evidence that an acute case is progressing favorably.

Bacterial organisms may develop a form of "fastness" when attacked by the same chemical substance continually. It is likewise recognized that there are many strains of gonococci, some of which are affected by one chemical while others react to another. It is therefore desirable to change the medication from time to time, especially when the voided urine persists in remaining purulent. In some cases, it is wise to suspend local treatment entirely for a time.

Persistence of the gonococci after three or four weeks of treatment is highly suggestive of prostatic invasion, even though there be no clinical evidence of posterior extension of the inflammation. In such cases, the prostate and seminal vesicles should be examined and carefully observed.

In the highly favorable cases these contingencies do not arise. The gonococci do not show "fastness," they quickly disappear under appropriate therapy, and the urine becomes clear with possibly a few shreds. At this stage the silver solutions may be superseded by a mild astringent, preferably zinc sulfate, 1:200. Here again one must keep a watchful eye on the voided urine. Any returning haziness or purulency in the urine serves notice that the astringent solution is irritating the mucosa or that occult bacterial organisms have become active. The microscope determines which of these two conditions prevails and the treatment is modified accordingly.

With a clear urine at this time, it is well occasionally to dilate the anterior urethra with the Kollmann dilator; some prefer the steel sound. The urethroscope may be used to locate any possible damage to the mucosa. If this produces no untoward result the treatment is gradually suspended and the patient placed under observation for several weeks. All of this may take from five to ten weeks, but I should consider it a great achievment if we could cure every case of acute gonorrhea in ten weeks.

Particular notice must be directed to a very important class of cases to which I have called attention elsewhere.[6,7] These cases go on for several weeks as a mild

anterior urethritis. Suddenly it is observed that both urinary glasses contain purulent urine. In some cases, the second voided urine is more purulent than the first. In either event, it means that the posterior urethra has become involved, even though there are no posterior clinical symptoms of any kind. The discharge at the meatus may be slight or nil. Rectal examination shows the presence of a large, soft or hard prostate, usually associated with enlarged vesicles. The urine voided after cautious massage of the adnexa, gives evidence of the existence of a chronic inflammation. Pathologically, the picture is that of a low-grade non-specific prostatitis of long standing in a patient who has acquired an entirely new and independent acute urethral infection. The congested adnexa in these cases offer an inviting soil for invasion by the gonococcus. If recognized early, the prostatitis responds quickly to gentle massage and mild intravesical irrigations. If this condition is not recognized, the prostate quickly succumbs to the gonococcal invasion and we now have to deal with an acute specific infection superimposed upon an old non-specific prostatitis, with a very decided tendency to chronicity. Since making this observation, which has been confirmed by Wohlstein,[8] it has been my practice to examine the prostate in every case of acute urethritis, with the result that many potential posterior infections with possible complications thereby have been averted.

Additional methods of treatment have been devised in recent years, but their future status remains undetermined. They aim to utilize the natural forces of the body in resisting the attack of the infectious process. The oldest of these measures is the use of vaccines. Opinions vary as to their value in acute gonorrhea, but the consensus of opinion is that vaccines have little if any value in uncomplicated acute cases. It seems that they have a stimulating value, however, in certain cases in which there is a sluggish response to local measures.

Foreign protein therapy also aims to increase the natural body resistance and is used extensively. Principal among the substances employed are sterilized or boiled milk, turpentine, typhoid vaccine and other protein substances injected intramuscularly or subcutaneously. The reaction which follows is a biologic response of the body, the natural resistance of which is increased by these agents. A combination of milk intramuscularly and an antistaphylococcal vaccine subcutaneously in the lower abdominal wall has been employed with success in Germany.

Autoserotherapy is said to exert a remarkably sedative action on the inflammatory process, especially in the presence of complications. The technic is simple: A few c.c. of blood are drawn off and incubated; of the resulting serum, 0.5 to 1.0 c.c. is injected intramuscularly every few days.

Intravenous therapy has been used for the direct attack on the infectious process through the blood stream. It is believed, according to Dale, that the injection of chemical substances directly into the blood acts somewhat like a protein injection; that the toxic effect on the bacteria is secondary and not direct; that they do not kill the parasites directly and immediately, but modify their virulence or lower their resistance to the body's natural defenses; that they form in the body some directly toxic products either by modification of its structure, or by its union with some tissue component, and that they have an affinity for certain cells of the host's body leading to the formation of a depot from which the curative substance is released.

The most prominent of these substances is mercurochrome 220. Young and his associates have used it with success in about 60 per cent of acute infections and their complications. Young regards the failures as having been due either to insufficient treatment or to the early development of reactions which prevented continuation of the treatment. The greatest objection

to mercurochrome is found in its toxicity, according to Braasch and Bumpus. In their experience severe reactions marked by prostration, chills and dysentery were common. Death occurred in two of their cases. Mercurochrome is not recommended as a substitute for the silver salts, but as an adjuvant to the local treatment. Young believes that mercurochrome intravenously attacks and destroys the gonococci in the deeper tissues, but the bacterial organisms on the urethral surface seem to escape its influence. It is therefore necessary to use the silver salts to combat the surface organisms.

Recently a modified method has been employed with much success in the United States Navy. Mercurochrome is given intravenously in a 1 per cent solution with 50 per cent glucose, in 10 mil doses. Milk and sugar solution is injected in the buttocks at the same time. The effect has been to diminish the severity of the reaction and to hasten the cure, in seventy cases thus treated.[10,11] Acriflavine and metaphen also have been used intravenously with more or less successful results.

McDonagh of England has devised a novel method of chemotherapy based on his original theory of oxidation and reduction, which has been highly praised by some and rejected by others.

Diathermy aims to destroy the gonococcus by the application of heat to the invaded tissues, and by increasing the body resistance. In acute anterior urethritis, the results have not yet justified our earlier expectations. In certain cases it is useful as an adjuvant to the local use of silver salts. Generally speaking, we can safely say that the silver salts, at present, constitute our most dependable and effective agent against acute gonococcal infection.

Thus far we have been considering those cases which have been confined clinically to the anterior urethra. It is immaterial for present purposes whether we accept or reject the view held by many that every case of acute gonorrhea extends by contiguity to the posterior urethra. Even if that view is correct, which I doubt, it nevertheless is true that a large proportion of cases do not show any evidence of posterior involvement, and therefore for therapeutic purposes, must be considered as being confined to the anterior urethra.

When the posterior urethra frankly is affected, the purulent urine voided in both glasses makes evident the fact even before the patient himself notices any change in his condition. The most that therapy can do in the circumstances is to check the severity of the inflammation and thereby prevent the development of complications.

Internal therapy remains the same as in anterior infection except that the water intake should be increased to the maximum capacity of the patient. For the chordee, camphor monobromate, two to five grains, is the classic remedy, but it often fails. Hot penile immersion may be more effective at times. Bromides and lupulin are used for the same purpose.

Hydrotherapy is of great value in the form of hot sitz baths and hot rectal recurrent irrigations. If there is evidence of previous over-treatment, the acute condition will be relieved by a cessation of all local treatment and the internal administration of a mild urinary sedative.

In the average case conservative local treatment is continued as before. Of course it is a difficult matter always to resist the temptation to wash out the deep urethra once or twice daily with an antiseptic solution; and while the results sometimes justify this common practice, it is as likely as not to be the exciting cause of an increased inflammatory reaction leading to epididymitis and other complications. If irrigation must be done, it is best done at a minimum risk of damage, with the Carleton hand syringe. The best way to treat the acute posterior infection is to leave it alone. A mild silver salt injection applied to the anterior urethra usually suffices to control the posterior infection in a most satisfactory manner. As already

mentioned, a small quantity of the injected solution enters the posterior urethra without violence or trauma and controls the inflammation until the acute stage has passed. This observation has been confirmed by Wiechowski, Klausner and others. With the passing of the acute inflammation, deep instillations of silver nitrate, 1:200 or protargol 10:100 are instituted. At the same time, the posterior adnexa are carefully observed and cautiously massaged. This acts as the most effective prophylactic against the development of a chronic inflammation. Young has recommended the instillation of mercurochrome solution as an antiseptic after prostatic massage.

Unfortunately many posterior infections do not respond so favorably to treatment. Certain cases are distinctly malignant in character almost from the outset; the inflammatory process instead of subsiding persists with increasing severity, in spite of any and all treatment, possibly because of it. The urine remains markedly purulent, often tinged with blood; the adnexa are intensely inflamed, large and tender; urinary distress reaches the maximum degree, even to the point of complete retention. It seems as though prostatic abscess or epididymitis must be the inevitable sequence, and very often this is exactly what happens. Foreign protein, vaccine and intravenous therapy often prove useful in these cases, but we have in vasotomy and diathermy two therapeutic agents which have demonstrated their great value in meeting this difficult situation.

Acting on the suggestion of Belfield, I have performed bilateral vasotomy in these cases as a prophylactic against the impending complication, with most gratifying results. Not only is the threatened complication averted but the entire infectious process takes on a much more benign aspect in every respect. Diathermy also is extremely useful in these cases, but its results are slower and less certain than those of vasotomy. Diathermy may be administered either with a prostatic electrode in the rectum, or with a pad electrode on the perineum, the indifferent electrode resting on the pubic region. The latter method is the more comfortable for the patient and probably more effective.

Prostatic abscess also frequently responds to these measures by bursting spontaneously into the urethra. If this does not occur, surgical incision and evacuation are indicated. Chemotherapy as advocated by McDonagh is said to abort these severe prostatic infections without recourse to other measures than vaccine injections after the use of his preparations.[12]

What has been said of the prostate applies equally to the seminal vesicles. These sacs are so closely connected with the prostate that they must be considered as one in the clinical sense. Vasotomy is by far the method of choice in the medication of the infected seminal vesicles, because it is the only method which positively reaches the interior of the sacs and the ejaculatory ducts. It is practically without pain and not followed by reaction. Stellwagen[13,14] injects five to ten c.c. of Pregl's iodine solution directly into the affected seminal vesicles through the rectum. He has had considerable success with this method.

Acute epididymitis stands next in frequency. The venerable hot poultice and ice-bag still are used frequently, but this means incapacitation for several weeks and a permanently damaged epididymis. Strapping has passed into the discard where it belongs. Recently introduced methods of treatment have done much to diminish the pain and prostration and the degree of permanent damage to the organ. Diathermy is the most useful of these; it is practically a specific. The pain is almost immediately controlled and the incapacitation is reduced from weeks to days.

Intravenous therapy also is employed, especially sodium iodide in distilled water, either alone or combined with methenamine. Mercurochrome, acriflavine, metaphen and similar substances have been used with varying degrees of success.

Non-specific proteins, especially milk and turpentine, are effective agents, relieving the pain and reducing the temperature within a few hours after the first injection. Vaccines are effective but not dependable. Young has injected a one per cent solution of mercurochrome directly into the inflamed epididymis, while Luys, of France, employed electrargol in the same manner with much satisfaction. Hagner's epididymotomy is the surgical method of choice, especially when pus is present. It would appear, however, that this useful procedure will become decreasingly necessary with the technical improvement in the methods just enumerated.

It goes without saying that with the passing of the acute inflammation of the epididymis, the infection in the seminal vesicles still requires serious attention because of the close etiologic relationship between vesiculitis and epididymitis. The same is true as regards acute arthritis, the most serious of the complications. There can be no effective treatment of the arthritis which does not include the eradication of the vesicular infection as the primary step. Everything else is secondary and merely palliative. For that reason, vasotomy may be considered almost a specific in arthritis; it eliminates the septic focus. Diathermy applied to the prostate and seminal vesicles also is very effective. Cumberbatch[15] and Corbus[16] acting on the principle that the infected joint is a metastatic extension of the basic vesicular infection, apply diathermy to the adnexa, with excellent results as regards the arthritis.

Stellwagen[13,14] has injected Pregl's solution into the seminauslly vesicles, as previo mentioned, with excellent effect on the affected joints. He states that the best results are obtained in the extremely acute joint cases with much effusion. Mercurochrome intravenously and the other preparations already mentioned are used, but the results are uncertain. Vaccines and foreign proteins, acting on the natural body forces, often show striking results in arthritis; but the main thing is to reach the infection in the adnexa and the joint itself will quickly respond.

It is necessary to add a word regarding the minor complications of acute gonorrhea. In order of frequency they are, balanitis, phimosis, paraphimosis, periurethral abscess, cowperitis and inguinal adenitis. The treatment is purely surgical.

Summary. Outstanding features of present day therapy of acute gonorrhea are the following: silver salts locally; copious water intake, supplemented if desired by an alkaline solution or one of the new chemotherapeutic preparations; avoidance of overtreatment; examination of the prostate in all acute anterior cases for an old non-specific prostatitis; in posterior involvement, the less local therapy the better; vasotomy and diathermy to avert acute complications; diathermy which is almost specific for epididymitis; vasotomy for arthritis and vesiculitis. Future progress lies in the direction of utilizing the natural forces of the body to combat the bacterial invasion.

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MODERN TREATMENT OF CHRONIC URETHRITIS*

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RECENTLY on receiving a request from our chairman to read a paper on the present day treatment of chronic urethritis, I tried to review some of the things that had been advocated,—serums, vaccines, electrotherapeutic measures, medicaments by the hundreds,—each of which at some time has been advocated as a cure-all. Their number alone should make us doubt their individual efficacy.

It must be conceded that progress in the treatment of urethritis has not kept pace with advances in other fields of urology. The recent work of Pelouze and others on the growth of the organism in the urethra, as well as studies developed from our better knowledge of the underlying pathology, etc., should warrant our assuming that treatment based on these various studies will be more productive of results in the future. In routine practice the present day urologist sees very few cases of acute urethritis. Those seen can be arbitrarily divided into two classes; the first group, merging on complete cure, and the second, those belonging to the group to be discussed.

Aside from the underlying pathology, the condition of these patients is due to preventable causes, either sins of omission or commission, or to inadequate or too drastic treatment. Sexual excess, repeated infection, neglect to continue treatment until a cure is effected, alcoholism, overexercise, etc., indicate that the patient with chronic urethritis in absence of visible signs or symptoms does not realize the seriousness of his condition and loses that restraining influence which is present during the active acute stage.

If we are to accomplish anything constructive in preventing the dissemination of this scourge which ranks with the major diseases in disability, we must concentrate not only on prophylaxis and rapid elimination of the gonococcus in the acute stage but realize that in education we have our most potent remedy. The foregoing conclusion is obvious when we consider the great amount of dissemination and spread that takes place during the subacute and chronic phases. The education of the diabetic is accepted as an essential element in the treatment. The training of the tuberculous patient is a recognized routine procedure. The prophylaxis of veneral disease must not end with a set of printed instructions unless they are fully explained, and in addition the patient must be given a thorough knowledge of the disease as affecting himself and his relations to others.

Definite location of the lesion is necessary to exact diagnosis and is only possible by detailed history, careful routine of physical, chemical, and microscopic examination plus urethroscopy. The elimination of a focus of infection or lithiasis higher up in the urinary tract as a cause of the cloudy urine is of primary importance. Every one here present tonight has surely had cases where a chronic discharge, specific or non-specific, was a mere smoke screen in the mind of the attending surgeon for pyelonephritis, a silent renal calculus, or a pyonephrosis. A urethral discharge in the presence of genital tuberculosis may at times present temporary difficulties in differentiation. Gonorrheal infection of the upper urinary tract may be a complicating factor. The definite presence of gonococci in the discharge or, in absence thereof, in the shreds or expressed secretion from the adnexa presents no difficulties with modern laboratory methods.

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Recent research would tend to show that culturing of the organism is not the difficult task formerly ascribed to it. The definite location of the infection, whether anterior or posterior, in the prostate or vesicles is essential to the proper treatment. Symptomatology is too well known to need more than passing mention. Williams claims that the complement fixation test is positive in 75 per cent of cases of chronic urethritis. Our experience does not bear this out.

Experience has shown that the three most prevalent local causes of a chronic urethral discharge are large calibre stricture, infection of the urethral glands and follicles, and prostatitis and vesiculitis with its attendant posterior urethral infection. Palpation of the urethra will sometimes locate an area of tenderness, infiltration, or nodulation which is defined by passing a bougie a boule or is visualized by the urethroscope. Careful examination of the meatus often shows a reduction in calibre or an adventitious gland opening which can easily be destroyed by the use of the hypo-diathermic electrode. Bimanual rectal examination may show a soft globulation with enlargement or induration of the prostate and thickening of the seminal vesicles with tenderness along the line of the prostatic urethra.

The treatment of chronic urethritis is in the field of the urologist. It entails more than the use of the endoscope. It calls for many types of instrumentation and differential diagnosis for complete success. If we can learn anything from past experience in our treatment of this condition, it is that conservatism pays best. The day of drastic treatment I hope is past. It is always well to remember that the natural immunity of the patient if not broken down by our efforts at cure is one of our greatest assets, and the constitutional treatment is important in maintaining it if present, and restoring it if below par.

Our first consideration as in the acute stage is the elimination of the gonococcus when present. A natural query at this time is, how has the acute stage been handled? Pelouze, in an effort to find a solution which might be of more benefit than those ordinarily used, stated in a personal communication that he found a solution which if used for irrigation of the urethra for any length of time gave rise to a persistent discharge which baffled all ordinary efforts at eradication. In chronic anterior urethritis the use of mild antiseptics, such as permanganate, or weak silver, in the form of irrigations or instillations, have and still hold an important place in our treatment of this condition. Of the silver salts, protargol, in our hands, gives the best results. The various penetrating dyes have not lived up to their early promise. The old slogan "keep changing the injection" still holds good in these cases. They may in this way be used at times with remarkably good results. No solution should be used until it is gonococcus-fast. The clearing of foci of infection in the anterior urethra by the foregoing with dilatation and electric coagulation by means of a needle-like electrode, etc., needs no further commendation. Instrumentation of the urethra while gonococci are still present is not advisable except where a particular indication exists. The importance of the posterior urethra, prostate, seminal vesicles, etc., as well entrenched strongholds for the gonococcus has been repeatedly emphasized. The eradication or destruction of the organisms in these locations is not difficult if not overtreated locally. For this purpose more therapeutic measures have been advocated and used than in any other phase of gonorrhea. The judicious use of these will determine our success.

We are indebted to McCarthy for a series of instruments which make visual diagnosis of urethral pathology a simple and exact procedure. Because it supplied a necessity, his modifications of the Luys urethroscope when supplemented by his cystourethroscope became a notable achievement. His panendoscope presented in 1923 has made the visualization of the

urinary tract as exact as an opthalmoscopic examination. By its use and the later development of a treatment attachment, the urethra has become as accessible of examination and treatment as the vaginal canal. It is advantageous in the visualization of large calibre stricture, a pregnant cause for persistent discharge. Applying silver nitrate, tincture iodine, etc., to the posterior urethra may be done visually. Electrocoagulation of diversified types of pathology on the bladder neck, the water fall, and the verumontanum so familiar to you as urologists, is easy of accomplishment. During the past eighteen months I have painlessly destroyed innumerable excresences, polypi, etc., with my hypodiathermic electrode as a routine part of the cystourethroscopic examination. The oft repeated use of the endoscope in making applications to the posterior urethra is not advisable. The traumatism may be more injurious than the actual benefit to be derived from the treatment.

Joseph F. McCarthy and J. S Ritter, in conjunction with several others, made a series of painstaking pathological examinations of the seminal vesicles in almost four hundred and fifty cadavers. Only in one was pathology found. When we consider that over two hundred specimens obtained from the Bellevue morgue were examined and that these individuals came from the lowest strata of society, it does not seem logical to assume that none of the individuals ever had gonorrhea with complicating vesiculitis, etc. While they do not feel that the findings justify a definite conclusion as yet, they bear out the opinion of McCarthy that the causative factor in our symptomatology of vesiculitis lies rather in an inflammatory and occlusive pathology of the ejaculatory ducts than in the seminal vesicles themselves. Only along this line of reasoning can we account for the successful efforts of Lowsley and Delzell, Young, and others in their treatment of the seminal vesicles, etc., through the posterior urethra by dilatation and injection of the ejaculatory ducts. That treatment of these structures by the use of massage, heat, electrotherapeutic measures, etc., alone is not universally successful, I believe must be conceded. That vasotomy does not yield the brilliant results claimed, except in the hands of the originators of the operations, is universally admitted. Catheterization and dilatation of the ejaculatory ducts with medication to the seminal vesicles when pathological, while not a simple procedure, is by no means difficult and is worthy of further investigation.

SUMMARY

1. Chronic urethritis is preventable in the majority of cases.

2. Chronic urethritis is essentially a urologic entity, entirely apart anatomically and clinically from its precursor, acute anterior urethritis.

3. Cure is dependent on our ability to locate infected foci, and having located them, to eliminate or destroy the gonococci, and restore tissues to their normal condition if possible.

4. Cooperation of the patient must be secured and is predicated on our imparting to him the knowledge requisite to his understanding the serious nature of his disease and its treatment.

5. The successful treatment depends on conditions and circumstances and the reaction of tissues to it, and nowhere in the realm of medicine or surgery is the maxim of Aristotle more appropriate than when used with reference to the treatment of chronic urethritis: "Not too much, not too little."

THE SURGICAL COMPLICATIONS OF GONORRHEA IN THE MALE*

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THE complications of gonorrhea in the male which may require surgical intervention occur most frequently during the acute stage of the disease. Some of them take place while the gonorrhea is still in the anterior urethra, but the most frequent and most important are those which are encountered only after the infection has become a posterior one. Of the complications occurring during an acute anterior gonorrheal urethritis, the following should be mentioned: periurethritis, periurethral abscess, cowperitis, balanoposthitis, abscess of the urethral glands and four very rare conditions, namely spongeitis, cavernitis, lymphangitis and lymphadenitis. After the urethral infection has passed the cut-off muscle, the following complications may arise: epididymitis, prostatitis, prostatic abscess, periprostatitis, periprostatic abscess, seminal vesiculitis, renal infections and the various metastatic lesions of which gonorrheal arthritis is a familiar example.

Pelvic peritonitis in the male as a result of gonorrhea is so rare that it deserves especial mention, and true gonorrheal cystitis is almost never seen.

Urethral stricture may occur either in the anterior or posterior urethra and as a result of gonorrheal urethritis, it is usually not observed until the lesion has become chronic or indeed until all clinical and laboratory evidence has disappeared.

On account of the time limit set for this paper, it is my purpose to discuss only those surgical complications of gonorrhea which the urologist sees comparatively often. The following conditions come under this heading:

1. Epididymitis
2. Prostatic abscess
3. Periprostatic abscess
4. Urethral stricture
5. Abscess of the urethral glands (frenal)

The diagnosis in most instances is not difficult. The various treatments, however, merit discussion. Most of the statistics cited as well as the various treatments described are based on observations made on the Urological Service of Bellevue Hospital during the past eight years.

Gonorrheal epididymitis occurs in about 20 per cent of male patients having gonorrheal urethritis. It is usually unilateral, though not infrequently bilateral. One attack usually predisposes to another. A swollen and painful epididymis, arising in the course of a gonorrheal urethritis, constitutes the diagnostic picture ordinarily seen. Fever is almost always present but rarely becomes higher than 102°.

When the diagnosis is not clear, non-specific epididymitis, torsion of the testicle and the various forms of orchitis should be borne in mind. The history of the case and careful examination of the urethral smear for gonococci will usually settle these questions, though of course, where pus is present and gonococci are absent, the specific nature of the condition should not be ruled out. Here the gonococcus compliment fixation test may be of value.

In most cases, about 94 per cent, the treatment of a gonorrheal epididymitis is non-surgical. Were it not for the efficacy of this non-surgical treatment as carried out at Bellevue, many cases of gonorrheal epididymitis would certainly require surgery. Hence emphasis of the non-surgical treatment should not be out of place here. This consists in the application of an adhesive plaster suspensory bandage, which both elevates and immobilizes the scrotum. The

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patient is then put to bed and kept there. This bandage and the technique of its application have been described so many times by various members of the Bellevue Urological Staff that I shall not bore you with still another repetition of its description; rather shall I bore you with only a repetition of its virtues. Suffice it to say, it is the most satisfactory method I know of which meets the two cardinal requirements of any scrotal bandage for epididymitis, namely, elevation and immobilization. I refer those of you who may not be familiar with it to the following articles which have appeared during the last five years—"Scrotal Bandages," by C. W. Collings, *Journal of Urology*, 1922, (VII, 501); "Gonococcus Epididymitis," by M. F. Campbell, *Annals of Surgery*, 1927, (LXXXVI, 577); and "The Treatment of Gonorrhea," by Keyes and Jeck in the Blumer Edition of the Billings-Forscheimer Therapeusis, 1924.

In the surgical treatment of gonorrheal epididymitis, epididymotomy as described by Hagner, is performed. This consists simply in opening the tunica vaginalis and making multiple punctures with the blunt end of a needle in the affected parts of the epididymis. Pus is usually, but not always, found by this procedure. However, the immediate relief of the patient and his convalescence are not necessarily dependent on the finding of pus. If a definite abscess is found, it is drained by incision. Rarely, involvement of the testicle is such that its removal becomes a necessity.

When should the surgical supplant the non-surgical treatment of gonorrheal epididymitis? If there is a palpable abscess when the patient is first seen, of course it should be opened and drained. Otherwise the adhesive suspensory bandage is applied and the patient is put to bed. An ice bag is placed over the scrotal part of the bandage and sedatives given if necessary. Indications for operation which may then arise are: (a) pain which is continuous and severe enough to prevent sleep; (b) continued high temperature or a septic type of temperature; (c) lack of tendency of the swelling to subside after two to four days have elapsed; (d) fluctuation, indicating abscess. Of the foregoing, pain has, in our Bellevue experience, been the most reliable criterion for operation, and is immediately relieved thereby.

As an objection to epididymotomy the plea is advanced that sterility occurs more frequently than it does in the non-operative case. But there seems to be insufficient data to justify this attitude.

The average hospitilization period for the patient on whom epididymotomy is performed is about 4 days longer than the average hospital stay of the patient treated by the adhesive suspensory bandage and rest. However, epididymotomy, if done early enough, may not only save the epididymis but the testicle as well. Epididymectomy may be necessary in those few instances where epididymotomy has been deferred too long or in cases of constantly relapsing epididymitis.

Prostatic Abscess. It is not always a simple matter to tell when a gonorrheal prostatitis has advanced to the stage of definite abscess formation. Fever, pain and acute retention may all be common to both conditions. Or, as it rarely happens, and quite paradoxically, both fever and pain may to some extent subside or disappear entirely as the abscess develops. Usually, however, the fever and pain increase and if the acute retention persists for more than forty-eight hours, a suspicion of abscess formation is warranted. Rectal digital palpation usually confirms the diagnosis. The prostate is found to be greatly enlarged and, as a rule, exquisitely sensitive. A boggy softening or definite fluctuation ordinarily leaves no doubt in the surgeon's mind as to the true condition but in many instances the diagnosis should be made on the intensity of the symptoms alone plus the continued retention before fluctuation ever develops.

The treatment of prostatic abscess will be briefly discussed in connection with the

third important gonorrheal complication, namely, periprostatic abscess.

Periprostatic Abscess. The same symptoms and signs of the foregoing condition may, and usually do, apply here. Usually where there is a periprostatic abscess there is also a prostatic abscess but the converse proposition is rarely true. The diagnosis is established by means of rectal digital palpation. Instead of the well-outlined, smooth rounded mass of the prostatic abscess, one feels a boggy inflammatory condition, usually irregular in shape extending to one or both sides of the pelvis, with a tendency also to extend forward. Tenderness is, as a rule, extreme and fluctuation is often present.

The treatment of prostatic and periprostatic abscess may be summed up briefly as follows:

For prostatic abscess, the "sound" operation.

For periprostatic abscess, perineal drainage. As a rule this should be extraurethral, but if the integrity of the urethra is threatened by the proximity of the abscess, then the urethra is opened as well and a drainage tube inserted into the bladder.

For both prostatic and periprostatic abscess, perineal drainage, either extra or intraurethral.

In a paper entitled "Operative Treatment of Prostatic Abscess" presented before this section in March, 1927, by Dr. A. R. Stevens, the "sound" operation for prostatic abscess was described in detail and statistics were given in support of its popularity with us at Bellevue. These statistics deal with the operations for prostatic abscess on the Bellevue Urological Service during the past eight years and are now brought up to the present time:

"Sound" operations, 84. Thirty-eight of the patients remained in the hospital after operation five days or less. The average post operative stay in the hospital was a fraction over seven days. There were two postoperative deaths.

Perineal operations, without opening the urethra, 15. Average postoperative stay was eighteen days.

Perineal operations through the urethra (external urethrotomy), 13. Average postoperative stay, thirty-four days. No deaths followed either perineal operation.

Urethral Stricture. The symptoms and diagnosis of stricture are so familiar to us all that I shall forego presenting them. However, it is well to remember that occasionally a patient, into whose bladder not even a filiform may be passed, will after complete anaesthetization take readily a sound of large calibre.

The treatment of urethral stricture may be summarized as follows:

Strictures of the pendulous urethra almost always, strictures of the deep urethra almost never, require urethrotomy. When urethrotomy becomes necessary, internal urethrotomy is the operation of choice in stricture of the pendulous urethra, while either internal or external urethrotomy may be performed in strictures of the deep urethra. In both instances, the criteria of urethrotomy are the presence of complications in the nature of dense infiltrations or periurethral abscess.

In uncomplicated stricture of the pendulous urethra, dilation by sounds may first be tried. When relapse which is almost certain to occur takes place within a week or two after dilation, then the stricture should be cut.

The complications of deep stricture necessitating urethrotomy are periurethral inflammations, such as cowperitis, abscess, and phlegmon. In these instances, of course the incision should be made through the perineum and usually, especially in phlegmon, with an unsparing hand. In the latter complication, aside from cutting the stricture, multiple free incisions into all the infiltrated tissue with actual debridement of the skin and subcutaneous structures when gangrenous, are necessary to prevent further spread of the infective process.

The maxim, "once a stricture, always a stricture," though perhaps not literally true, should be kept in mind both by the

patient and by the surgeon. For whether the primary treatment of a stricture is by sound or operation, the treatment does not end there. In fact this is but the beginning. The passage of sounds must be continued indefinitely (perhaps for the remainder of the patient's days) at intervals sufficiently short to permit of no relapse.

A fairly common and often troublesome complication of gonorrhea is

Abscess of the Urethral Glands. The gland in which an abscess most frequently develops is situated in the neighborhood of the frenum. When involved if it is grasped between the thumb and index finger, it feels almost like a buck-shot which has been buried in the tissues, and is frequently noticed first by the patient himself. When seen by the surgeon, it often explains remissions in a urethritis which otherwise progresses satisfactorily.

The abscess communicates with the urethra by means of the small duct through which the infection gains entrance. Later on, it usually breaks through to the outside, but as a rule neither the external nor the internal communication is sufficiently large to permit of proper drainage. Imagine then, if you will a state of affairs which, when represented graphically, may be compared in shape to a minute Coolidge *x*-ray tube. The dilated middle portion of the tube represents the abscess, while one of the narrow ends is a fistula of exceedingly small calibre running into the urethra and the opposite narrow portion another minute fistula with its exit close to the frenum.

The diagnosis is made by the palpation of the small shot-like mass, which is moderately tender on pressure and situated just underneath the frenum.

Treatment: Incision into the abscess pocket, from without in. The incision should include the outer fistula and the outside opening should be somewhat longer than the diameter of the abscess itself.

SUMMARY

In acute gonorrheal urethritis, the surgical complications fall chiefly into two groups, those of the pendulous urethra, and those of the deep urethra. Of the first group the chief complications are periurethritis, periurethral abscess, cowperitis, balanoposthitis, abscess of the urethral glands, spongeitis, cavernitis, lymphangitis and lymphadenitis. Of the second group should be mentioned: epididymitis, prostatitis, prostatic abscess, periprostatitis, periprostatic abscess, seminal vesiculitis, renal infections and the various metastatic lesions. Urethral stricture is common to both groups. Pelvic peritonitis and gonorrheal cystitis are both extremely rare.

The following complications, which are those most frequently encountered, are the only ones discussed:

Gonorrheal epididymitis may at times be confused with non-specific epididymitis, orchitis or torsion of the testicle. Treatment is surgical (epididymotomy) in six per cent of cases. Non-surgical treatment consists of a properly applied adhesive plaster suspensory and rest in bed.

Prostatic Abscess and Periprostatic Abscess. Exquisite tenderness which persists, acute retention and fluctuation are the main diagnostic points. If the abscess is wholly within the prostate, the "sound" operation is indicated. If the abscess is periprostatic or both intra and periprostatic, open operation (extraurethral) through the perineum should be done. External urethotomy is performed only when the pathological process involves the urethra.

The diagnosis of *urethral stricture* may be erroneously made if the patient fails to relax and cooperate with the surgeon. The mistake in diagnosis is not discovered until proper relaxation is had by means of an anaesthetic.

Uncomplicated strictures of the pendulous urethra almost *always*—uncomplicated strictures of the deep urethra almost *never*, require urethrotomy.

Abscess of the urethral glands (frenal) requires free incision from without in—not by intraurethral approach.

THE TREATMENT OF GONORRHEA IN THE FEMALE*

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DURING the last two decades there certainly has been a great diminution in the number of cases of infectious diseases including the exanthemata; in fact it has become an axiom that every community can prevent a typhoid epidemic by tracing its cause to the source. Only twenty years ago every hospital ward throughout the country contained its quota of typhoid cases but today they are an unknown entity with the exception of sporadic epidemics; the treatment was prophylactic and preventative. Serology rendered immunology, and prophylaxis prevented its propagation. The same can be said of diphtheria. Prophylaxis through the field of serology is saving thousands of children that otherwise would have gone to their untimely end. Diphtheria and typhoid are diseases which follow the wake of nutritional necessity. We must breathe to live, and in the process of respiration we contract a disease of which diphtheria is a biproduct. We must satisfy thirst and hunger and in the process of digestion typhoid is but a biproduct.

In order to discuss intelligently the treatment of gonorrhea, whether in the male or female, we must be able to draw a sharp contrast between a venereal disease and one that is contracted in process of our nutrition. Gonorrhea, while an infectious disease contracted in 99 per cent of all cases outside of childhood, through the act of venery, becomes one for discussion on the ground of preventability for it is contracted not during the process of necessity but one of choice. I am endeavoring here to drive out into the open a disease which we can view from all sides and the first astounding feature is that as we have attempted to treat it or eradicate it we have done so under cover. It is a disease contracted in the private walks of our life and not in the public market place where we have flaunted our air of respectability. It is of necessity a biological disease. Let me illustrate. A species of tropical fly can carry within its own protoplasm another organism which if implanted into another living organism can produce a disease capable of destroying an army. The same can be said of the gonococcus; it is an organism whose habitat may be the male or female human being and lie dormant for indefinite periods but once implanted into another human being rehabilitates its own vitality and makes its inroads into the health of its new receptor.

This suggests to us that with the implantation of this microorganism there must be various phases of the disease produced which are the acute or productive stage, the subacute or subsiding stage and the chronic or the dormant stage. The treatment of these various stages in the female must invoke specific methods such as hygiene and sanitation, medical and surgical procedures, serum and vaccine therapy, electrothermal and prophylaxis.

My own experience in the treatment of gonorrhea in the female has taught me that adherence to the technique of treatment has been far more beneficial than a variety of methods, and that antisepsis as a principle is more valuable than a variety of antiseptics.

All acute cases are preferably put to bed for seven to ten days. Alkaline douches mechanically remove the discharge and the organisms that lie in the vagina, lessen absorption of toxins, and have a tendency to lessen reinfection.

The physician's treatment of the patient

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for a week or ten days daily, and then every other day throughout the course of treatment, consists in swabbing the cervical canal with a cotton applicator dipped in one of the following solutions: 10 per cent argyrol, 2 per cent silver nitrate, 1 per cent acriflavine or 2 per cent mercurochrome. On the same occasions 10 per cent argyrol or 1.2000 acriflavine or 1 per cent mercurochrome is instilled into the bladder. If the urine contains pus, the instillation is preceded by irrigation with normal boric acid solution. The patient is instructed to give herself the following treatment at home: one dram of 10 per cent argyrol or 1 per cent mercurchrome is injected into the vagina by means of a glass McElroy male urethral syringe while the patient is lying upon her back in bed. A thick guard is applied and the argyrol or mercurochrome is retained all night if convenient. The next morning she takes a cleansing alkaline douche, and after breakfast argyrol or mercurochrome is again instilled into the vagina, retained for an hour and douched out. For an hour after lunch argyrol or mercurochrome is kept in the vagina and then removed by a douche.

At bedtime argyrol or mercurochrome is placed in the vagina for the night as before. The patient is directed to occupy a bed by herself, and not to engage in coitus till she is pronounced well. Fluids are forced, as they aid in the elimination of toxins and help to remove pus.

Stubborn cases in non-pregnant women have been treated with a few drops of 10 per cent mercurochrome carefully instilled into the cervical canal by means of a curved pipette to which has been attached a medicine dropper bulb, and the results have been surprisingly good.

Pemberton adds that the treatment of the urethritis is about the same, although nothing active is done during the early stage of the disease. As urination is painful, sandalwood oil in ten minim doses three or four times a day seems to have a soothing effect. After the acute symptoms have subsided, 1 per cent mercurochrome solution is injected into the urethra at the time the other treatment is being given, taking care to inject only about two cubic centimeters of the solution, to avoid carrying the infection into the bladder, and the lining of the urethra must not be injured.

In chronic gonorrhea in women, a recent German writer (Loeser) has employed the vaccine treatment. Not earlier than eight weeks after the acute stage he injects intramuscularly a vaccine made from the first or second passage of gonococci. The first injection should contain 300,000-000 germs, and he gives six to eight increasing doses at intervals of three or four days. If this does not improve the condition, to continue is useless, and in such cases he gives a single subcutaneous injection of 0.5 c.c. of a suspension of a living culture. The injection produces a swelling but within a week the gonococci have frequently disappeared. The author says the treatment is useless in open gonorrhea.

In Johnson's recent brief report on mercurochrome in the treatment of gonorrhea in women, he cites a case in which expert examination found gonococci in smears from the urethra, introitus vaginae, vaginal vault and the cervix uteri. The patient was told to take a douche of warm water on retiring, then with the index finger protected with a rubber cot, she pushed a 2 per cent mercurochrome suppository up into the Douglas pouch. This she repeated every night for fourteen, wearing at all times a napkin.

Ten days after this series of treatments smears from the urethra introitus vaginae, Douglas pouch, and cervical canal, all proved negative. This was repeated twice with an interval of seven days between the examination of smears, and on both occasions the smears were found negative. All the symptoms disappeared and have not returned. The author, while not claiming to cure gonorrhea with mercurochrome, says that it thoroughly penetrates

the lining structures of urethral, vaginal and cervical membranes and frees these parts of the gonococci, also causing the symptoms of the disease to disappear.

The application of the electric cautery to the treatment of gonorrheal endocervicitis offers two distinct advantages over the older, more haphazard methods. First, it provides a means of curing the irresponsible patient who will not cooperate in her own treatment; seconds, it affords the physician a method of curing the conscientious sufferer.

Shutter describes his technique of cauterizing the cervical canal as follows: "The application of the cautery to the canal of the cervix is seldom painful and is usually done without anesthesia. A small nasal tip cautery is introduced into the cervix as far as the internal os, the current is then connected and the tip is gradually drawn outward. One or two such strips are made at a time, an effort being made to confine the application to one or two sides of the canal. Little or no pain is felt unless the heated instrument comes in contact with the vaginal mucous membrane. The extent of the cauterization at any one time depends on the ease with which it is borne by the patient, the chronicity of the infection, and the relation of the time of treatment to the menstrual cycle. From two to four treatments at intervals of from ten days to two weeks are usually given. This repeated application of heat in the canal is a factor in the result, as it kills the bacteria in the glands. Nabothian follicles and erosions respond rapidly to treatment. When anesthesia is necessary in giving treatment an effort is made to complete the cervical cauterization at one time. If this is done, the patient is confined to bed afterward, and to date no bad results have occurred. Immediately following treatment the cervical discharge is profuse. Bleeding for several days after cauterization is common but not severe, and patients should be informed of this possibility. Vaginal douches are not given in the first few days following treatment. As a rule, cervical secretion is scanty by the sixth week after the last cauterization."

Diathermy is strongly advocated by various writers for the treatment of gonorrhea in women. Corbus and O'Conor, in their latest article on the subject, describe and illustrate in detail their technique for the application of this method of heat treatment of gonorrheal endocervicitis. They call attention to the fact that it has been demonstrated that the gonococcus is instantly destroyed at a temperature of 113°F., or at 104°F. prolonged for from six to eight hours. And since the normally nourished epithelial cell can survive a temperature of 118°F. for one hour, and connective tissue cells even higher temperatures for longer periods, the reason of the therapeutic possibilities for destroying the gonococcus within the living tissue by heat is manifest.

In order to insure success with diathermy in gonorrheal endocervitis, the authors state that it is necessary to have a satisfactory high-frequency machine; the method of conveying the best radiation (with an active and an inactive electrode) should be properly designed and adjusted; and the time of application of the heat radiation, which is at a temperature of 116 to 117°F., should be not less than twenty-five minutes, and may extend as long as sixty minutes, with a varied reduction in temperature.

Walther employs diathermy in treating endocervicitis, and instead of excising Batholin's ducts and Skene's glands, when they are infected, he uses the same modality for cauterizing them. By the insertion of a blunt-tipped needle electrode into the duct, both the Batholin duct and its gland can be sterilized in a few seconds, and the after care consists of topical applications of a 10 per cent mercurochrome solution.

To sterilize Skene's glands the diathermic needle is employed through the electric skeneoscope. Usually one gland is treated at the time because of reactionary

edema which follows high frequency cauterization here. Within three days or a week the other gland is sterilized in the same manner under local anesthesia.

Surgical treatment of gonorrhea in the female has not changed materially in the past twenty years except probably toward conservatism. A greater lapse of time has been given between the onset of developing of salpingitis and the period of operative procedure. The time ordinarily allowed to produce a chronicity and a complete walling off together with the production of sterility on the part of the gonococcus has greatly lessened the mortality and postoperative morbidity. During the preoperative stage there has been to my mind great constructive advances in protein therapy. While I believe that it is rash for men to say that a pyosalphinx will disappear under milk injection there is no doubt that the fulminating hydro-pyosalpinx can be reduced by physiological absorption through the medium of protein injection. Gelhorn is optimistic enough to say that 30 or 40 per cent of the operative cases will evade the operating table by the milk injection. Rawlings who has contributed liberally to our information by foreign protein treatment takes the attitude that patients are much safer undergoing an operation than those not so treated. My own experience has shown that milk injections following surgical interference aids rapidly in the absorption of tissue where there has been parametric thrombosis. Gonorrhea is different from syphilis in that the latter is a protean disease as only 7 to 10 per cent of gonorrheal infections become hematogenous in character.

The prophylactic treatment of gonorrhea to my mind affords the most hopeful avenue of approach through the medium of education and police power. If we wish to plot a curve of the number of cases of gonorrhea in both sexes, two years previous to the war it would be almost astounding to watch the drop in the curve between 1917 and 1920. This was the result of police power and education. The army and navy tackled the venereal problem with its police power and viewed the disease as a biological one. Just as they have instructed their men not to drink any water except that which was boiled, likewise they made imperative the reporting of all coitus in order that prophylactic measures could be given early.

This leads me to believe that if our health powers, municipal authorities and sectarian bodies would offer to the public through channels of education the same opportunities as offered by the militia our plot curves would not have gone up as they have done from 1921 to 1926. I am still radical enough to believe that when we teach the dangers of contracting gonorrhea as we do typhoid and diptheria in academic institutions we will more nearly approach the millennium of health.

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THE ROLE OF THE GONOCOCCUS IN STERILITY*

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THE gonococcus itself plays no role in sterility either in the male or female. There is absolutely no antagonism either between the gonococcus and the spermatozoon or the gonococcus and the ovum. A man suffering from an acute gonorrheal urethritis may impregnate his wife and infect her with gonorrhea at the same coitus. In other words, there may pass through a urethra harboring gonococci, semen containing live spermatoza without the vitality of the latter being diminished in any way. This fact, while known clinically, was definitely proven by me experimentally over 14 years ago,[11] when I mixed up on a slide semen containing live spermatozoa with virulent gonorrheal pus, without noticing any diminution or change in the activity of the spermatozoa. In the female we find the same conditions. A woman suffering from gonorrhea may become impregnated and bring forth offspring. Cases are on record[2] where women suffering from acute gonorrheal purulent salpingitis, have been impregnated, showing that the gonococci have no detrimental effect either upon the ovum or the spermatozoon. Even prolonged contact between gonococci and spermatozoa does not appear to hurt the latter.

How then does the gonococcus become the important factor in the production of sterility in both sexes? It is only by causing pathological changes in the male and female genitalia that this dire consequence is produced. To be systematic, I will now, in the short period of time alloted me, discuss the effect of the gonococcus on the various sex organs in the male and female.

Let us start with the male, commencing with the testicles, the source of production of the spermatozoa. It is perhaps not generally known that the gonococcus produces at times changes in the spermatogenic function of the testicle. This has been demonstrated by me in a few cases where I aspirated the testicle in persons suffering from acute gonorrhea.[11] I have found in patients who had borne several healthy children, and who have subsequently become infected with gonorrhea, that upon aspiration no spermatozoa could be demonstrated in the aspirated testicular fluid. In other cases, however, spermatozoa could be demonstrated, showing that the gonococcus will in some cases for the time being destroy the testicular function of the testicles and in others not. My experiments, however, in this class of cases are very few in number, and more extended experiments in aspiration of the testicles may perhaps determine definitely just what occurs.

It is in the epididymis that the most damage occurs, as regards male sterility. Here again it is to be noted that it is not the gonococcus itself, but the inflammatory reaction caused by the gonococcus, mechanically occluding both epididymi, which causes the sterility. This fact is so generally well known that it is not necessary for me to dilate upon it any further. There is one caution, however, in this regard which I have brought out in some of my previous publications,[15,16,17,18] and that is, that we may have a combination of occlusion of the epididymi and absence or destruction of the spermatogenic function of the testicles so that, before operating upon such occlusion, we must determine by aspiration of the testicle whether spermatozoa are present in order to avoid needless operation.

We next come to the vas deferens.

* Read before the Section of Genito-Urinary Surgery, New York Academy of Medicine, November 16, 1927.

Here again we may have occlusion just as in the epididymis, and everything I have stated regarding the epididymis applies to a certain extent to the vas. In addition I would like to call attention to a form of vasitis, to which I have frequently called attention in many of my publications,[15,16,17,18] but which has not yet found its way into many of our excellent genitourinary textbooks. I refer to cases in which during gonorrhea there occurs such a slight inflammation of the vasa that no clinical evidences of it is noticed during the gonorrhea or thereafter, but the inflammation is sufficient to occlude both vasa, causing absolute sterility. In these cases there was never a clinical history of an acute epididymitis, and there are never later found the thickenings which are characteristic of a previous epididymitis, yet condom specimens show absolute azöospermia, while aspiration shows spermatozoa in the aspirated testicular fluid. This definitely demonstrates that the cause of the sterility is not in the testicle nor in the epididymis, but in the vas. This conclusion can only be arrived at by aspiration of the testicle.

Coming next to the prostate and seminal vesicles, we again find no antagonism between the gonococci and spermatozoa. It is a well known clinical fact that a patient may be apparently cured of his gonorrhea, and still harbor gonococci in his prostate and seminal vesicles. It is just these cases, as is so well known, that are so tragic in producing gonorrhea in the bride after the husband had honestly thought that he was perfectly well and safe; and generally such husbands will not be sterile, though harboring gonococci in the prostate and seminal vesicles. This illustrates that even prolonged contact between gonococci and spermatozoa do not injure the latter. It is this condition which is generally supposed to be a frequent cause of one-child sterility. Moreover, in attempting to determine whether a patient is cured of his gonorrhea, condom specimens have been submitted to culture for gonococci, and it is not unusual to find gonococci present on culture in a condom specimen showing normal lively spermatozoa. It is of course possible, and probably does occur at times, that necrospermia results from a gonorrheal seminal vesiculitis, but here again it is not the gonococci, but the altered seminal secretion which causes the death of the spermatozoa. Just exactly to what extent necrospermia is due to this condition has not as yet been definitely determined.

We next come to the ejaculatory ducts and their openings in the posterior urethra. Theoretically, the same occlusions which occur in the tubes higher up may also occur here. Practically, however, since the modern procedure of catheterizing the ejaculatory ducts through the modern urethroscopes, and also injecting them for purposes of roentgen-ray examinations, it has been demonstrated that sterility is very rarely due to occlusions here. When I say very rarely, I mean in proportion to the other causes. Moreover, in cases of occlusions very low down, there would also be aspermia (absence of any ejaculation) which is indeed a very rare condition.

Coming now to the last anatomical division, namely the urethra, both anterior and posterior, we find that it plays very little role in the etiology of sterility. As before mentioned, the urethra may harbor an untold number of virulent gonococci without killing the spermatozoa. In order to make this portion of the discussion complete, I might say that in very bad cases of stricture of the urethra, ejaculation may be so interfered with as to become a factor in the production of sterility. But this again is a very infrequent factor in sterility, as it must be a very bad stricture to materially hamper ejaculation, and even in some of these cases, though perfect ejaculation does not occur, the semen may dribble out of the meatus after the penis has resumed its flaccid condition and impregnation may occur.

In concluding the discussion of the role of the gonococcus as a factor in male sterility, I may mention the fact that gonorrhea is very rarely the cause of impotence in the male, and so plays but a very minor part in the production of sterility in this manner. I have frequently remarked that I have often been tempted to wish otherwise, for if gonorrhea were frequently a cause of impotence, and this fact were generally known, it would not only limit the spread of the infection but would be a most powerful deterrent of illicit coitus. As a matter of fact, impotence itself, no matter from what cause, does not necessarily cause sterility.

In the female we may say generally that the main pathological conditions caused by the gonococcus, which are the most important factors in female sterility, are found in the cervix and in the tubes. Owing to its histological structure, the adult vagina does not harbor gonococci for any length of time. Those cases in which gonococci are frequently found have been definitely proven to be due to continuous reinfections, either from a gonorrheal cervix, or from cohabitations with an infected partner. Even in these cases the vagina plays but a minor role because, barring exceptions, it is only those spermatozoa which are ejaculated directly on the cervix during coitus that cause impregnation. Even in normal cases the spermatozoa which linger but a short time in the vagina are quickly killed off by the vaginal secretions.

In the cervix, however, the gonococci very often set up a purulent endocervicitis which so alters the normal cervical secretions that the spermatozoa are either killed or become entangled in the mucus and are unable to make their way upwards. In performing the "Huhner test" shortly after coitus, it is very interesting to note under the microscope live spermatozoa in the cervical mucus, but these do not dart freely about the field as in normal cases but are stuck either by their heads or tails in the mucus, the free parts wiggling about in their frantic efforts to disentangle themselves. I would especially emphasize, however, that this condition is not pathognomonic of gonorrhea, as other forms of endocervicitis may have a similar effect on the spermatozoa.

While gonococci have been found in the fundus uteri, especially by Curtis,[5] in the vast majority of cases in which they were found the patient had been regularly exposed to reinfections. As a matter of fact, Norris in his great book "Gonorrhea in Women" says that while gonorrheal endocervicitis is very common, gonorrheal endometritis is a very rare condition. It has been supposed that gonorrhea so alters the uterine endometrium that it becomes unfavorable for the nesting of the impregnated ovum; nevertheless pregnancy has occurred in the presence of a severe, purulent gonorrheal inflammation of the decidua.[2]

It is in the tubes, however, that the gonococci cause pathological changes which are a profound factor in sterility. Here again I would emphasize that it is not the gonococcus itself, but the pathological changes in the tubes which it causes that produce the sterility. As mentioned at the very commencement of this paper, pregnancy has occurred in the presence of an acute gonorrheal purulent salpingitis, showing that neither the ovum, nor the spermatozöon, nor the impregnated ovum are destroyed by myriads of gonococci. As a matter of fact, however, the gonococcus disappears with comparative rapidity from the tubes. It has been previously supposed that gonococci remain for indefinite periods in the walls of the Fallopian tubes though disappearing rapidly from the lumen of the tube. Curtis,[7] however, has proven that even in the walls of the tubes they do not linger for any length of time. He made cultures of over two-hundred pairs of thoroughly ground Fallopian tubes and found that it was hardly ever possible to obtain the gonococcus longer than two weeks after the disappearance of the fever and leucocytosis. As a result of his experi-

ments he has come to the conclusion that gonorrheal salpingitis is essentially a self-limited process, and that persistent active gonorrhea of the Fallopian tubes is attributable to recurrent infection rather than to chronic infection, and that, with re-infection prevented, the Fallopian tubes should heal spontaneously.

As is well known, the pathological changes in the tubes caused by the gonococcus result in either a complete closure in both tubes or a change in the epithelia of the tubes or their fimbriated ends, mechanically preventing either the ovum from descending or the spermatozoa from ascending. The closure of the tubes can be demonstrated by the Rubin test. This test is so well known that it is not necessary to describe it before an assemblage like the present. There is one point, however, which I wish to emphasize and that is that the test should be performed in *every* case of female sterility, irrespective of the history, for it has been demonstrated over and over again that the tubes may be occluded in women in whom there has never been even a suspicion of gonorrhea.

Coming finally to the ovaries, we may briefly reiterate that here also it is not the gonococcus itself but the pathological changes brought about by it which causes the sterility. As a general rule, it is only when there has been produced a productive inflammation that completely imbeds the ovaries in masses of adhesions or causes such thickenings of its tunica as to mechanically interfere with ovulation, that sterility due to gonorrhea results.

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Discussion

Dr. N. Lapowski, New York: The biological aspect of the gonococcus is seen in the arrangement of the papers constituting this symposium. We note that a patient under treatment for an anterior urethritis is liable to complications and a spread of the trouble and, as a result, may be transferred to several physicians, from the surgeon to the cardiac specialist.

We know that the gonococcus is immobile and extension is caused by trauma or active physiological functions; among the latter I may mention coitus, menstruation, pregnancy and mechanical manipulation by a physician.

To destroy the gonococcus on the surface is the abortive treatment, but not the treatment of anterior gonorrhea. To abort an early acute case the superficial and deep gonococci must be reached. For thirty-five years I have heard of remedies that would accomplish this destruction but as each newly advertised remedy is found wanting a new one takes its place. Of all the remedies and methods we have, to my mind, the best, at the present time, is diathermy. This, because it reaches deeply and by the rise in temperature produced in the tissues destroys the gonococcus. But it must not be used in the urethra as the mucous membrane may be affected by the burn which may be easily produced.

We must remember that the gonococcus may keep its vitality after application of a temperature of 115° F. As to its longevity, it has been found in a vital state forty-nine and fifty years after the primary infection. It resents injuries. Its motto is "J'y suis, J'y reste," meaning, "Here I am and Here I will remain." Still there are physicians who claim they can cure gonorrhea, but they forget that it is spread every night.

We know very little of the physiology or biology and surely nothing of the pathology of the spermatozoa.

The best method to follow in treating gonorrhea is not to use injections, but treat it as you would any other inflammatory condition. By this method many surgical complications will be avoided. I am sure that surgical complications are observed more often in the overtreated case than in the undertreated one.

A SIMPLE DEVICE FOR FACILITATING RECTAL OPERATIONS

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WHEN operating upon the rectum of a male patient in the dorsal lithotomy position, the proper retraction of the scrotum and penis becomes a problem. To meet this problem there have been devised, of course, various contrivances. Perhaps the one which is most generally used is that of a folded towel moistened with bichloride solution. The middle of this is placed under the scrotum and the ends of the towel laid into the groins. Having no definite attachments the position of the towel is not infrequently shifted. The scrotum being thus left unsupported comes tumbling down on to the perineum in a most exasperating manner.

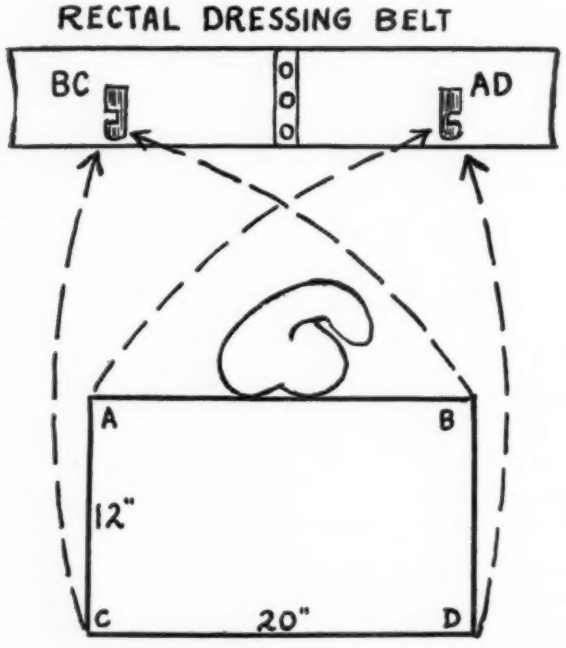

FIG. 1.

To avoid this divergence from efficient technic the device I now mention was developed. It consists merely of a piece of plain muslin 12 × 20 inches. This is saturated in a bichloride solution and then wrung out. The manner in which it is attached constitutes the entire "trick" of the device. This may be briefly described as follows: Before going to the operating room the patient is equipped with a perineal dressing belt such as I described in the Journal of the American Medical Association June 1926, (LXXXVII, 30) under the name of "An Improved Rectal Dressing Binder." It consists of a broad elastic belt upon which are fastened flat clasps as shown in the diagram. After the patient is anesthetized and his legs are put up in the stirrups the aforementioned muslin kerchief is applied as follows: corner A is fastened onto clasp AD and corner B is fastened onto clasp BC. The edge of the muslin AB is then adjusted by suitable tightening so that the base of the scrotum and penis are entirely enclosed therein. When such adjustments have been satisfactorily made, the lower edge CD is folded up over the scrotum and the corners C and D are fastened on to clasp BC while corner D is held by clasp AD. Thus it is evident that the upper corners of the muslin kerchief are attached to clasps on opposite sides while the lower are attached to clasps on the same side.

When the device just described is used one may proceed with absolute confidence that neither the operative field nor his peace of mind will be disturbed by the sudden intrusion of the genitourinary department into a strictly proctological procedure.

SURGERY: ITS UTILITY IN PHTHISIS*

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THE indications in the treatment of pulmonary tuberculosis are, first, to place the patient in surroundings most favorable for the maintainance of a maximum degree of nutrition; second, to take such measures as in a local or general way, might influence the tuberculous processes, and third, to alleviate symptoms. These indications were set forth by Osler more than thirty years ago and they still point the way to those who would lend a hand to these people. It would appear, however, that these indications have taken on a different significance. Heretofore, surroundings have referred more to location; today surroundings signify relief from environmental pressure, both external and internal; measures taken to influence the tuberculous processes have referred to tuberculin or specific drugs; now they suggest, more especially, surgical procedures; measures taken to alleviate symptoms implied the use of drugs; now they mean the employment of functional rest, both local and general.

In the present-day treatment of phthisis these three indications, now commonly accepted, are followed but in their new significance. The promotion of a state of nutrition at the expense of digestion and assimilation is not advocated; the continuation of bed-rest in the absence of evidence of active disease is not advised; the postponement of steps to anticipate the effects of sinister influences (physical defects, pathological conditions, focal infections) is considered not wise. Granted that these people are doomed to a life of invalidism or to premature death unless assisted, it would seem necessary, if they are to be rescued, to undertake constructive rather than palliative efforts in their behalf.

Therefore, the end in view in the modern management of phthisis is not to make the patient fat and strong and leave the lesions in the lungs to take care of themselves; the end in view is to make the tissues of the body clean with respect to infection and to make it possible for all the tissues of the body to function physiologically. As it is not possible to accomplish these desirable conditions except through the application of surgery, its utility in this chronic affliction is apparent and is becoming more evident every day as the limitations of medicine are appreciated. Surgical intervention is not only essential to but also is, rational medicine.

Our confidence in surgery to influence favorably tuberculous processes in the lungs and thereby to prolong some lives with usefulness, is based upon certain conceptions of physiology and pathology. To some of these we would invite your attention at this time, as well as to the merits of the two surgical procedures—pneumothorax and multiple costectomy—with which we have had some experience.

With respect to the physiology of the lungs, we will consider first, the fact that the lungs are in a state of tension within the thorax. They fill out the thoracic cavity because the visceral pleura and the parietal pleura have always been in apposition; they grew that way. The lung tissue itself, takes up but very little room; most of the space is taken up by air. How the air gets in, is a matter about which there is difference of opinion. The point

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which we wish to make is that whenever circumstances permit it, the lungs will recoil just like a piece of elastic, and a certain amount of contraction ensues which involves one lung at first but later both lungs are relatively affected.

If these observations are true, we may appreciate what happens when the volume of the thorax is reduced by surgical methods. The healthy lung tissue as well as the diseased tissue, contracts; the healthy tissue contracts the most at first, but sooner or later it begins to expand while the diseased tissue remains contracted. As a result the various lesions become surrounded by tissues in a state of contraction or relaxation but differing in degree: the tissues immediately about the lesions are in a state of complete functional rest, those more remote are in a state of relative inactivity, while those farther away are in a state of comparatively normal activity.

Another conception which we regard as pertinent is atelectasis. Atelectasis is a phenomenon seen to the best advantage at birth just before respiration is initiated. The mechanism for the exchange of gases—oxygen and carbonic acid—is all set to go but two most important factors—blood and air—are lacking. The so-called "secondary circulation" has not yet become established; the walls of the tubular structures and alveoli are still in apposition. A roentgenogram of the chest of a stillborn child shows only a homogenous shadow in which no organ, not even the heart, may be made out. When the Eustachian valve closes and the pulmonary circulation gains momentum, the lung tissues become rigid, the walls of the bronchi and alveoli are forced open and air enters simultaneously through the upper respiratory passages. (Thus does man begin his pansophic career.)

Atelectasis of both lungs occurs only at birth, but some atelectasis may occur during life, in one or both lungs. The amount present depends upon the depth of respiration. Atelectasis observed in life is known as functional atelectasis. Functional atelectasis may be regarded as a conservative event; it is the natural way for the lungs to rest. In the presence of injury or disease, some of it may be observed immediately about the parts affected where it appears to act as a buffer between the tissues injured and those actively functioning. It apparently serves to protect the former from interference and to preserve about them the most favorable conditions for healing.

Now the great similarity between contraction of the lung and functional atelectasis should be appreciated. The difference, if there is any, is apparently in the position of the lung; when it contracts, it recoils toward the mediastinum; when it enters into a state of functional atelectasis, partial or complete, it collapses in the direction of the chest wall. In other words, contraction of the lung and functional atelectasis are the same in affect.

If these observations are true, then contraction of the lung or functional atelectasis, or what Alexander calls "physiological amputation of the lung," should be promoted in the presence of disease for several reasons; first, because it is highly desirable to secure as complete rest as possible to the diseased tissues; second, because it is well to secure about the parts affected an ample barrier of defunctionalized tissue, lest the processes of defense and repair be disturbed; and third, because lung tissue in a resting state, probably offers greater resistance to the further spread of the process; it tends to localize the effects of the disease.

Still another physiological conception which seems to us to be relevant is that healthy lung tissue is best accomodated in the space nature made for it.

If this observation is true, it follows that healthy lung tissue should not be permitted to expand into, nor be forced to work in, a space larger than is normal for it. Under such circumstances it would be embarrassed and it is likely that the individual would be inconvenienced; for the threshold of his respiratory comfort

would be lowered. It would seem advisable therefore, when a tuberculous process has produced tissue destruction, to reduce the volume of the thorax commensurately so as to anticipate the compensatory alevolar hypertrophy required to fill the space left by the tissue destroyed.

Now if these observations are pertinent as well as true, the application of surgical measures, such as pneumothorax and multiple costectomy should be applied upon physiological rather more than upon pathological considerations. If they will accomplish the effects which we have tried to describe, they should be used ere the processes have become widespread, not only for the good that they may do but also for the harm that they may save. The remediable forces of nature alone might cure a very large number of those having an experience with tuberculosis, if they would only give their cooperation intelligently and indefinitely. But experience proves that the majority of patients are in too much of a hurry; they may submit to discipline for a while but ere long they want to be set free; they want to go and do what other people are doing. Heretofore not so many have followed directions in a sensible way and not so very many have shown the capacity to practise the self-direction essential to success. Too many expect us to find the way out of the trouble for them, particularly those who have tried "cures." Surgery has proven its ability to help; it would seem well to increase its opportunity.

With respect to the pathology of this very serious malady, we will consider first, what makes the difference between the forms which are tolerable and the forms which are dangerous to life. The first essential in the difference is the metastatic diffusion of germs. In the forms which are tolerable the forces of defense and repair are apparently sufficient to prevent excessive bacillary metastases; in the forms which are dangerous, the spread of the bacilli and their products into new tissue is apparently too rapid.

The second essential is contamination of the lesions of tuberculosis by other organisms, especially the streptococcus. Often a tuberculous process burns itself out and the individual enjoys relief. But too often such a tolerable situation is spoiled by infection with secondary organisms. In consequence the equilibrium of such patients becomes precarious, to say the least. The final stages of pulmonary tuberculosis owe their clinical features largely to catarrhopyogenic infections. Were it not for these, many people might live with tuberculosis for years in a state of health, comparatively safe and comparatively satisfactory.

The third essential is an unclosed hole in the lung. Within cavities, whatever their size, lie blood vessels whose walls have been weakened by the inflammatory changes which have existed about them. Such blood vessels no longer supported, may rupture with disastrous consequences; supported, such a sequence of events would be forestalled.

If these three observations concerning pathology are true, then there is no escaping the conviction that the victims of advanced pulmonary tuberculosis are in great danger. If any of them are to be saved for themselves as well as for service, they should be given the benefits of surgery while there is yet time.

We would now like to call attention to one more aspect from a pathological point of view, which seems to be worthy of consideration, namely, the crippling effects of natural healing. We will quote the words of Prof. Sayago, who evidently very well senses this situation. "On cicatrizing, the tuberculous lesions, particularly those of the cavernous type, bring about a reduction in the volume of the diseased lung which, then, causes other anatomical alterations that favor the cicatricial process . . . Sclerosis of the tuberculous foci compromises the normal static condition of the thoracic wall, of the vertebral column, of the mediastinum and of the diaphragm, all of which may

suffer displacement and retraction of variable intensity . . . The most important of these mechanical alterations is the deviation of the trachea and heart which at times, reaches considerable proportions. It is in such conditions that surgical procedures lend their aid, completing the work that the organism has imposed but has not been able to terminate, owing to the impossibility of conquering the rigidity of the thorax."

There are a number of other observations concerning the physiology and pathology of the lungs which might be mentioned and which are relevant. But if only these which we have set forth are borne in mind, one may appreciate how surgery may influence favorably tuberculous lesions in the lungs.

Among the advantages claimed for the methods—pneumothorax and multiple costectomy—employed in the management of certain cases of phthisis, are the following:

First, they may save the patient time, punishment and money. They may accomplish in a few weeks what months of bed-rest would never bring about successfully. After one has witnessed the relatively rapid improvement in a febrile, toxic patient following directly the introduction of a few hundred c.c. of air into the pleural cavity or following a well-executed multiple costectomy, one cannot but realize that the patient is being saved months of invalidism, suffering and expense.

Second, they may induce relaxation of pulmonary tissue. Apparently essential to the localization and healing of a focus of infection in the lung is the establishment of an ample degree of defunctionalized tissue about it. This is nature's barrier to check the metastatic diffusion of germs and is a part of the process of defense and repair.

Third, they may make possible the apposition of the walls of cavities and the cessation of accumulation. Unless holes in the lung are closed to the invasion of microorganisms, most distressing is the state of these people.

Fourth, they may exercise control over the situation in the lungs irrespective of the cooperation of the patient. With one or both lungs artificially deflated up to the limit of tolerance, a patient may not pursue activity without disturbing his respiratory comfort.

Fifth, they may create about the lung most affected conditions conducive to its welfare regardless of the behavior of the individual. Thus protected, a patient may become industrially efficient with more safety.

Sixth, they may anticipate the crippling effects of natural healing, especially the embarrassment of the heart due to its displacement and fixation in an abnormal position.

Undoubtedly a larger number of susceptible people would be more successful in their struggle with pulmonary tuberculosis if their management might be undertaken and might be intelligently carried on before irreparable damage had ensued through neglect. It is altogether too evident that the danger people with tuberculosis of the lungs are in is not being sensed opportunely and that a *laissez faire* attitude is being entertained too long toward many cases making little or no progress with respect to recovery. Too many cases are striking examples of conservative therapy applied without success, with as little foresight as though pneumothorax and thorocoplasty were not available. Standing in the way of success in the surgical management of the terminal stage of pulmonary tuberculosis is the appearance of the cases too late, due partly to the disposition of people to let well enough alone and partly to the apparent reluctance upon the part of the profession to resort to other than medical measures until the patient is mortally ill.

Brown says, "The neglect of cavities and the continuance of sanatorium treatment for cases that never had the slightest chance of closing cavities, unassisted, is bad practice. The wrong in the situation, if there is one, is the neglect of the individual until surgery is a last resort."

Dubrow says, "The perfection of technique in thoracic surgery and its more general application have materially aided in enlarging the list of restored cases."

If one considers all the circumstances surrounding the victims of phthisis, it is obvious that only a very few, relatively speaking, are being given a chance. Until time and experience have demonstrated the superlative advantages of good surgical management, it is evident that many are going to miss their opportunity to make a recovery.

With reference to the radical methods employed to induce contraction of the lung in the management of advanced pulmonary tuberculosis, we would like to emphasize the following:

First, sanatorium or conservative treatment is to phthisis what morphine is to appendicitis. The patient is only temporarily made comfortable in the majority of cases while his chances of life are ebbing.

Second, just as in appendicitis, so in advanced tuberculosis of the lungs it is dangerous to delay the induction of conditions the most favorable for healing within the thorax.

Third, if the methods of inducing contraction of the lung are feasible methods, it is our duty to apply them early, lest the individual lose ground and become incurable.

For the sake of appreciating the effectiveness of these methods in the relief of this very serious condition, it is also necessary to remember that the normal coefficient of improvement may not be determined in any case. One cannot ever know in a condition like chronic tuberculosis how effective any measure applied for its relief may be, because one cannot establish a true basis for comparison. The only real control is the individual himself and as he cannot be used for treatment and control at the same time, there is no way to determine certainly just how much good the effort exerted in his behalf did him. The effectiveness of any "cure" or of any method of treatment, like pneumothorax or thorocoplasty, may only be established approximately, as it may seem to effect more recoveries than would ordinarily be expected.

Absolute rest of the parts affected secured by exercising control over the physiological activity of the adjacent lung tissues, in the presence of a spreading tuberculous process, is good practice. It is recommended for the transformation of such a process into a healing one. Surgical procedures to reduce the functional activity of a lung affected by disease should be undertaken early, lest irreparable damage ensue through neglect. It is most advisable to anticipate the sinister influences of fibrous pleurisy or adhesions, the nonspecific infections of the tubular structures, and the continuous escape of tubercle bacilli and their products into the general circulation.

Discussion

E. W. Hayes, M.D., Monrovia, Calif.: Surgery, meaning the more general use of pneumothorax and thoracoplasty, is a relatively recent adjunct in the handling of pulmonary tuberculosis. Just what its position should be in this work I feel has not yet been clearly determined. However, the results of this form of treatment have established the fact that it is a valuable asset in properly selected cases. As in any form of new therapy, I think it is well that we should adopt a conservative attitude lest the pendulum swing too far in its favor.

Years of experience have demonstrated that tuberculosis in all its stages may be effectively cured by the rest, nutritional, and climatic regimen, and that a large number of these patients so cured are returned to health without apparent crippling defects.

In the essayists' discussion we are given the impression that resort to surgery should be made even in the early cases. With this I do not agree because in the first place, under proper supervision and care, the great majority of these cases will recover without surgical intervention. In the second place, surgical intervention is not void of undesirable results. Pneumothorax, the simpler of the surgical means, to be effective, must be carried out for

more or less of an indefinite period. Again, it has its complications such as superimposed spontaneous pneumothorax and hydrothorax which may become pyothorax. In the case of a pyo- or a long standing hydrothorax, or even a long induced pneumothorax the pleura becomes so thickened that when the induction of air is discontinued the collapsed lung does not expand, but with the mediastinum it shifts to eliminate the air space, and the result is a marked hypertrophy of the other lung and a marked deviation of the mediastinal contents.

Thoracoplasty is a much more serious procedure than pneumothorax. There is a distinct surgical shock involved which tuberculous patients in general do not well withstand. It also necessitates a contralateral lung with very little, if any, active disease. Again, it brings about such a marked deformity in the chest wall that we are hardly justified in subjecting our patients to this procedure before they have been given a reasonable opportunity to demonstrate whether or not they can recover their health without it.

I agree with the authors that we should not be too conservative regarding these procedures, and that many times patients who are taking the cure are allowed to drift along perhaps for several years until their finances are gone and their spirit of determination broken, while with others the possibility for help and restoration to health has passed. The timely intervention of surgery in many of these cases would greatly shorten the period required for this first class to regain their health, while in the case of the second class it would in many cases be a life saving measure. However, I believe we should sound a word of caution lest it become the general impression among tuberculous patients that surgery opens up a short cut for them to health and that it is not necessary for them to chase the cure. The result would be a spirit of restlessness which would be a serious handicap to a large number of patients whose tuberculosis could be cured in a relatively short time by a conscientious cooperation in carrying out the treatment without subjecting themselves to the hazards of surgery.

The authors in their opening paragraph have stated that "the indications in the treatment of tuberculosis are to place the patient in surroundings most favorable to the maintenance of a maximum degree of nutrition, to take such measures as in a local or general way, might influence the tuberculous process and to alleviate symptoms." To these I would add, and perhaps as the most important, to place the patient, as far as possible, in an environment which will enable him to reconcile himself to the disease and to the cure, and thus bring about a proper mental and emotional relaxation. Under these circumstances the physician would be in constant mental contact with his patient and at the same time would be able to keep himself in constant touch with the disease process. In this way patients would not only be given a proper opportunity to regain their health without surgical intervention, but the physician would be enabled by his knowledge of the individual patient as a whole and by his acquaintance with the type and character of the disease process in the lungs to determine when surgical intervention should be instituted.

We must always endeavor to place ourselves in the position of the patient and in the light of our knowledge to make our decisions accordingly.

Charles C. Browning, M.D., Los Angeles: Surgery of the chest has made rapid strides during the past few years, and great benefit has accrued to many patients.

When marked advances have been made through the introduction of new methods there is a tendency for the existence of ultra-conservatism on the one hand and over-enthusiasm on the other.

The position taken by Doctors Hoit and Mattison regarding the operation of thoracoplasty on early cases appears to me to be somewhat advanced and extreme at this time; it may appear to be conservative within a few years. Naturally, there is a tendency to consider all improvement due to treatment administered, overlooking the many cases who recover without special form of treatment.

I believe that much good will come to an increasingly large number of patients from skillful, conservative chest surgery performed upon carefully selected cases.

Carl R. Howson, M.D., Los Angeles: Pneumothorax has been a wonderful addition to our therapeutic armamentarium, and there is no doubt that it has meant life and health to many thousands of otherwise doomed patients. Thoracoplasty is a procedure of much more recent development, and one from which we hope for great things. Pneumothorax is a procedure having a very slight operative risk.

It can be discontinued at any time. The majority of the patients undergoing it eventually have healed lungs which function with approximate normality when permitted to expand. Thoracoplasty is a major surgical operation, and once done cannot be undone. The changes brought about are permanent. If done for a patient who has been receiving pneumothorax, it renders unnecessary the prolonged repetition of air injections.

Much of what has been said regarding the uncertainty of the future of patients treated medically and their failure to cooperate fully is only too true, but viewing the situation as a whole I cannot feel quite so pessimistic as the authors about the outcome under medical treatment. The great majority of early and moderately advanced cases are cured by such means. It is unfortunately true that many of them suffer relapses. Pneumothorax and thoracoplasty greatly lessen this risk in most cases but they do not do away with it.

Even the induction of pneumothorax is not devoid of risk, apart from that of the operation itself, for as yet we cannot always determine whether the better lung will not manifest new or increased activity following compression of its fellow. This risk is much greater with thoracoplasty.

The formation of fibrous tissue is the essential process in the healing of tuberculosis, and, as has been pointed out, in the far advanced cases this is not always devoid of undesirable effects, such as distortion of the trachea and displacement of the mediastinum and heart, but these are not necessarily of serious import. It is surprising how much such displacement can occur without giving rise to symptoms or discomfort. We frequently see patients whose hearts are greatly displaced, even entirely to the right of the midline, who complain only of some shortness of breath on exertion, perhaps not more than the curtailment of pulmonary tissue would account for. The displacement occurs very slowly and the heart possesses great power of adaptability under such circumstances. These patients are usually quite unconscious of any abnormality. The same is true of pleural adhesions.

An open cavity is no doubt somewhat of a menace to the individual and yet we see many persons who have been restored to full earning capacity who carry open cavities in one or both lungs for indefinite periods. Were thoracoplasty devoid of risk, we should probably advise most of such persons to be operated upon. However, until the operative mortality drops far below its present figure, we must think well before subjecting our patients to the procedure. In the last analysis it is a matter for the clinical judgment of the physician and of the surgeon working together. The physician has studied his patient, usually over a long period of time, and knows something of his reactions, something more than can be learned in the brief period the surgeon is likely to have him under observation, and it is only by close cooperation between them that the patient's interests will be served. In properly selected cases we may hope for life-saving results, and as the technic is improved and the operative risk correspondingly decreased, the indications for the operation will probably increase.

Drs. Mattison and Hoit: We are well aware of the success of the medical treatment of cases of pulmonary tuberculosis and we appreciate the liberality evident in the discussion, in conceding that surgery may offer certain cases of phthisis a better chance of recovery than medicine. We regret that we have not been successful in the management of cases in the last stages of consumption; we have yet to see a case "doomed to a life of invalidism or premature death" cured by medicine. We have seen several cases of phthisis restored by means of surgery to an unprecedented state of health and in a relatively short period of time. It is easy for us, therefore, to see very great possibilities for good in this form of therapy and to see even greater possibilities for good, if only it might be utilized as a preventive, to stop "an advancing lesion in the lung, especially in people who cannot afford medical treatment and who must continue to work in spite of their pulmonary tuberculosis." We believe that there are very many cases of phthisis who are losing ground for the lack of surgical assistance and we are confident, as the result of our experience, that many of these might, through surgery applied in time, be returned to the world not exhausted and industrially useless but vigorous and capable of earning a living.

We rejoice to witness surgery increasingly employed in the field of pulmonary tuberculosis. It has seemed to us so hard for these people when they have been refused indicated operations because of their pulmonary condition. Forced to get along without such aid, forced to carry a load of infection in tissues

outside of as well as within the lungs, they have not been given a fair chance to make a recovery, in our opinion. In our minds there is no doubt about the ability of the majority of patients suffering from the various forms of chronic pulmonary tuberculosis to go through even serious operations with comparative safety with respect to life and with respect to the process in the lungs. We believe that the sooner all the tissues of the body including the lungs, are made clean, with respect to pyogenic organisms, the better for the patient. We are convinced that lung tissues are endowed with powers of defense against infection, just as are other tissues, if not more so, and that they are quite as amenable to the application of surgical principles of treatment. It is incumbent upon us to study the physiology of the lungs, to learn about pneumodynamics, to sense not pathology so much as the "state of defense of the organism attacked" to the end that we may render surgical aid in pulmonary tuberculosis at the most opportune time. To prolong bed-rest disregarding the welfare of the whole body for the sake of a part is not good physiological sense; to shorten the period of convalescence by any "short cut" which can be developed is good medicine; to save patients suffering time and expense in their struggle with pulmonary tuberculosis is worthy of our unceasing efforts and transcends all other considerations.

For years medical men have placed barriers against surgeons arounds the field of pulmonary tuberculosis. Until recently they have regarded this field as their special domain, forbidding surgeons to enter at their peril. They have hardly ceased raising the alarm of "fire" (reactivation of a tuberculous process) whenever operations of any kind have been suggested. Fortunately a few surgeons have dared to break through and the results of their work prove that surgery has an equal if not a dominant place in this field of medicine. The roentgenogram, the sputum test, the nuclear shift and the blood sedimentation tests are not less fallible than years of experience and are quite as full of meaning to the intelligent surgeon as to the veteran specialist.

There is no good reason, in our opinion, why every case of pulmonary tuberculosis, found in an advanced stage or tending that way, should not have the benefit of a good surgeon's experience and skill. There is no justification, in the light of accumulating experience, for postponing surgical intervention in cases of phthisis until the patient is at the point of death. Soon surgeons will take their rightful place in the field of pulmonary tuberculosis and insist that advanced cases be submitted to them for their examination and operation if in their judgment it is indicated, just as now they ask and fully expect performance in cases of appendicitis.

THE TREATMENT OF FACIAL SCARS

WITH REMARKS ON THEIR PSYCHOLOGICAL ASPECTS

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THERE are certain psychopathic phenomena which are encountered in the practice of plastic surgery which have received little or no attention, or at least seem not to have been commented upon in the literature. The citation of one or two illustrative cases will perhaps serve better to bring out the important points than would an abstract psychological discussion of the subject.

A surgeon from Chicago brought to me a man upon whom he had operated for a scar which had crossed the Langer lines on the cheek. At the time the operation was performed, some five years previously, the patient was tuberculous. Although the surgeon who performed the operation had done excellent work, he had lost sight of the fact that scars in tuberculous persons, especially when they cross the Langer lines of tension, are likely to show thickening, and this scar had proved to be no exception to the rule. An obsession relative to the scar, which had evidently developed long before the operation was performed, increased thereafter. The doctor was at his wits' end to know what to do. Despite my desire to be of assistance to him in his predicament, I refused to operate because of the man's psychological condition, feeling that no matter how fine and unobtrusive might be the line which would remain after operation, the obsession would not be removed. This same man came into my office two months ago. The scar, which I would have recognized had it been noticeable, had almost disappeared. When he recalled the scar and the circumstances of the former consultation, I told him he was to be congratulated upon the disappearance of practically all traces of the operation. His reply was: "You can still see the scar in certain lights and something must be done about it. Scars on other parts of my body do not show like this one." He then exhibited two scars, one on each wrist, which were due to attempts at suicide on account of the almost invisible scar on his face.

Obsessions of this sort are common in scar cases. I have brought up this case because, in addition to the obsession, it affords an opportunity to call attention to three points: (1) The lines of Langer and their effect on scars; (2) the effect of the tuberculous diathesis on scar formation; and (3) the irregular formation of scar tissue in individuals of a keloid tendency.

Several reasons deterred me from attempting to operate upon this patient. First, I was well aware that the work of the surgeon who had operated upon this patient was of the finest character. Therefore, the thickened scar was not in any way due to the fault of the operator, and furthermore it would probably reform following a secondary operation. It is an accepted principle of facial plastic surgery that in any operation on a scar that crosses Langer's lines of tension the result will not be as satisfactory as though the original scar followed the direction of these lines. Secondly, the patient, in the case under discussion, was of the tuberculous type, in fact, had spent three years in a tuberculosis sanatorium. Practically all tuberculous patients develop scars that thicken into welts before they disappear,

and these welts remain for many months. Thirdly, this patient gave evidence, to a certain extent, of a keloid tendency. Here it may be well to point out that a person may have a keloid tendency affecting one part of the body and yet show no such tendency in other parts of the body. That my judgment was correct in deciding not to operate in this case was shown by the fact that later the man attempted to commit suicide on account of his facial defect, which I could not have remedied.

Fig. 1. Author's oblique cutting scapel.

This is only one of many similar cases which I might cite.

Earlier in my career in reconstructive and plastic surgery, I had no hesitation in operating to improve any type of scar that might be presented for treatment, but experience has taught me that many factors should be considered before attempting operative intervention in facial defects.

There comes to my mind the case of a young woman who consulted me for the correction of a z-shaped scar on the neck. On examination it could be seen that the defect could be remedied by three small minor operations, two longitudinal incisions running parallel to one another, each including part of the oblique line of the letter z, followed later by one operation consisting of a longitudinal incision which would include the two parallel scars, thus converting the z into a linear hairline. The original z-shaped cut had been received when the patient was a child. In this case the operation was started without taking into consideration that, in the first place, the patient had an obsession relative to the manner in which the original scar detracted from her appearance. In the second place, I failed to take into account the fact that the patient had a tuberculous diathesis, and that corrective wounds would form welts which would persist for a considerable period of time and would retain their redness longer than in the average case. The result was that after the second operation the young woman did not wish to submit to a further surgical procedure because the redness was so slow in disappearing. By the time the red coloration had disappeared the resultant scars, though only hairline in each instance, had become the subject of such a marked obsession with her that she threatened suicide. She was referred to Dr. Habermann, who stated that she was a psychopath, and that the obsession had probably been present long before corrective measures had been instituted. He was of this opinion because on close examination he could see only the fine hairlines that remained after the attempt to remove the original disfiguring z-shaped scar.

This brings me to another point, namely, the prognosis regarding the results of scar removal in patients of the type under consideration. When an individual has a tendency to become obsessed with his defects, the surgeon, knowing his ability to minimize the defect, is tempted to advise the patient of the results of his experience as applied to his particular case. He is likely to state that the outcome of operative intervention will be to reduce the scar of considerable size to one of the type known as "hairline." When he yields to this temptation, he is treading on dangerous ground, for the reason that even with everything favorable to a perfectly satisfactory end-result, there are many conditions that may arise to interfere with the usual favorable course of events before the ultimate end-result is attained. The individual is often impatient and expects to see a pleasing result immediately. Under these circumstances an obsession may develop during the preliminary stage of a reconstructive procedure requiring two or more separate operations, and when the corrective operation is completed the patient may still be dissatisfied.

In order to illustrate to what extent, short of suicide, an obsession will sometimes affect an individual, I may cite

the case of a beautiful young woman who recently came to my office heavily veiled, wearing two veils, in fact. When she raised these two veils she exposed a small pock mark, which ordinarily would not have been observed by ninety-nine out of one hundred persons. She informed me that she never went out with her face exposed in the day time, and often sat beside the river debating as to whether life was worth living when she had such a disfiguration as this pock mark. The danger of operating upon such patients is self-evident because regardless of the degree to which the scar is minimized, the obsession will still persist. On the other hand when a scar constitutes an actual deformity and such actual deformity can be markedly improved by operative intervention, the plastic surgeon is enabled to effect a change in that patient's mentality which probably could not have been achieved by any other means.

PROGNOSIS

These cases are sufficient to impress upon the reader the necessity of considering scars from the standpoint of obsession; and before proceeding to discuss the various types of scars from the etiological and clinical standpoint, it may be well to discuss a little further the matter of prognosis. Under no circumstances should the surgeon commit himself on the subject of scar prognosis. He cannot be too guarded in this respect. He should always advise those who come to be operated upon for a scar, that while he is usually able to minimize the scar to a point bordering upon invisibility, a great deal depends upon the healing power of the individual and upon his personal idiosyncrasy. Indeed, these factors are just as important as the surgeon's skill.

ETIOLOGY OF SCARS

It is essential that scars be considered from the etiological standpoint for it is only in this way that one is enabled to decide what operative procedure is applicable in each individual case.

There are many agencies which may produce scars, but by far the vast majority of scars are caused by accident or operation. These are called *traumatic* scars.

The term *electrical* is applied to those scars which are produced by radium, roentgen rays and short-circuit injuries. A scar which results from the overaction of radium or roentgen rays is usually flat and mottled, with a white shiny base and scattered pigmentation. Scars of this type usually extend deeply into the tissues, often causing the skin to become adherent to the underlying structures. While they give no visible evidence of being congestive, they are, nevertheless, the most difficult of all scars to treat satisfactorily. They bleed excessively, and the condition of the tissues is such that grafts or transplants do not "take" kindly and readily slough out. If such a scar is small in extent and an attempt is made simply to excise the scar tissue and draw the apparently healthy skin together, it will be found that the surrounding area, while having the appearance of health, has a decided tendency to heal poorly or to slough out, leaving a wound as large, or nearly as large, as the original scar (Fig. 2).

Short-circuit scars are those which result from electric explosion due to short-circuiting. They are usually burns and are associated with a certain amount of copper infiltration of the resulting wound. The microscopical flakes of copper injected into the tissues produce one of the most painful of wounds. Fortunately, however, unless the burn is extensive little or no scarring results and as a rule time will do more to eliminate this type of scar than will the surgeon's knife.

Caustic scars may be produced by excessive action of any of the corrosive acids or alkalies. In these cases the surrounding tissue is usually healthy, so that in their treatment only actual scar tissue without additional surrounding skin need be removed.

Phosphorus scars, that is, scars resulting from phosphorus burns, on the other hand, are similar to short-circuit burns in that if given sufficient time they will usually disappear almost completely of themselves.

Under the heading of skin diseases we find three types of scars which are in each instance difficult to handle. These are the *pock-marks* left by smallpox, chicken-pox and acne rosacea. These scars if not too deep are best treated by the dermatologist who advocates their elimination by applying to the area involved caustic acids, usually mixed with oil. These methods are known to the layman as "skinning" or "face peeling."

Fig. 2. Example of the mottled appearance of a radium scar.

Scars which are the *results of malignancy*, for example, those of healed rodent ulcer or those remaining after the resection of an epithelioma, usually hold out to the surgeon a danger signal. The attempt to remove a defect of this kind often ushers in the return of the original malignant condition. A case comes to my mind in which an epithelioma of the lower lip had been resected. The patient was later referred to a plastic surgeon for reconstruction of the lip. The scar before excision was old and white and there were no signs of any malignancy until after incisions had been made for the removal of scar tissue. Within a few weeks the incisions for the plastic work were beds of epithelioma cells.

A few months ago I was consulted by a patient who had been successfully treated for rodent ulcer. The left orbit and left side of the nose had been involved by the disease. Nothing remained at the points of attack but scar tissue. I refused to operate or to undertake any reconstructive surgery. The patient then consulted another surgeon who attempted to transplant tissue and reconstruct new parts. Within a period of a few weeks all the incisions were in a condition similar to those in the case quoted above. Malignancy had attacked the operative field and the patient was considerably worse off than before the attempt had been made to improve his condition.

In the subjects of constitutional disease, three types of scars must be considered: the *tuberculous*, the *syphilitic* and the *idiopathic* scars. Just why thickened scars should form in a person who has a tuberculous heredity or active tuberculosis is not known. It is my belief that this phenomenon has something to do with faulty aeration of the blood, for the reason that similar scars may form in patients suffering from temporary bronchial affections. For example, one patient upon whom I had performed a series of operations for paraffinomata had formed unusually fine cicatrices. After one operation, however, she had a severe attack of bronchitis which confined her to bed for several weeks. This one scar resulting from this one operation, out of the many that had been performed immediately before the attack of bronchitis, resulted in a typical tubercular-like, thickened scar. Later when the patient had fully recovered her health this scar was removed, and then the usual fine cicatrices formed.

Scars of the scalp heal kindly as a rule but are subject to two minor postoperative defects: first, sebaceous cysts may form along the line of incision or laceration; second ingrowing hairs may develop along the same line. Hence for some time following operation the patient should be kept

under observation in order that any sign of the development of these conditions may be detected.

Syphilis may cause a scar to become depressed, due to absorption of areolar tissue underneath the wound. In these cases it is, therefore, always advisable to recommend antisyphilitic treatment in conjunction with any operative procedure which must be undertaken.

Certain scars may be said to be *idiopathic*.

There are varieties of ticks in the tropics, which burrow underneath the skin, produce congestion and cause an urticaria of the overlying skin. The area of congestion becomes converted into shiny fibrous tissue having all the appearance of a cicatrix. Scars somewhat similar in appearance are often found following pregnancy and also following loss of weight in previously excessively obese individuals. These scars are usually superficial in appearance, slightly depressed, free and white.

TREATMENT

In the treatment of scars, in addition to taking into consideration the etiology, the character of the scar itself plays a part in deciding upon the most appropriate procedure to be followed.

Superficial scars may be entirely removed and their place filled in with a graft or transplant, or they may be removed in a sectional manner, the surrounding healthy skin being undercut and stretched over to bridge the section removed. This method is the one I prefer when it is applicable.

Deep scars, if not adherent to vital underlying structures, may be similarly treated, the deeper tissues removed at the time of operation, being replaced by transplants of fat.

Scars may be *free* or *adherent* to underlying structures; they may be *white* and atrophied, or *red* and congested. It is not good policy to operate upon a scar while it is red and congested, since the result may be a recurring scar just as annoying as the original.

Contracting scars result from heat burns and scalds. If the burn is severe they may produce deformities of the surrounding tissues. Before operating upon this type of scar, it is advisable to inject the scar tissue with thiosinamine over a period of several months. This softens the scar tissue and permits the operator to obtain a better estimate of the amount of skin grafting necessary to meet the requirements of the defect.

Fig. 3. Example of a contracting scar.

Angular scars (Figs. 4 and 5) are always best handled in two operative procedures for if the surgeon attempts to eliminate them in one operation the area at the angle of the wound may undergo necrosis. These scars almost invariably require resection of the fat from beneath the angle of the original wound. Otherwise they develop an overhanging condition, the tissue above bulging over the tissue below the wound angle.

Depressed scars are usually also adherent, so that before operating it should be explained to the patient that it is usually necessary to remove a section of fat from another part of the body for use as a transplant to replace the deep scar tissue which must be removed.

In the treatment of the opposite type of scar, namely the *elevated* scar, many methods are employed. In the earlier part of this paper the cause of elevated scars was considered, so it is unnecessary here

to state that the condition of the patient must be taken into consideration. Has he a keloid tendency? Has he a tuberculous tendency? Is he suffering from a temporary bronchial affection? In some of these cases the triple treatment brought to the attention of the profession by Grattan produces very gratifying results. In other cases it will be found that excision alone is all that is necessary. But in every instance the cause should be sought and, if found, should be combated by the usual methods of constitutional treatment.

Fig. 4. Overhung scar, showing fatty tissue in the angular flap.

Fig. 5a. Angular scar showing collection of fatty tissue in the lower angle.

Motheaten scars, that is, those resulting from infection in dense tissue such as the end of the nose, have received this designation because of their appearance. This type of scar (Fig. 8) is greatly depressed at its center, and it has sharp, definite edges. Scars of this description require considerable preliminary treatment before surgical correction is attempted. The base of the scar should be stimulated to form new granulations by scarification with either the knife or trichloracetic acid. At the same time the edges also may be treated with trichloracetic acid to remove their sharpness. The application of this acid alone will often produce the desired results and will save the surgeon the necessity of undercutting the surrounding skin and endeavoring to approximate the edges.

Fig. 5b. Same scar after primary operation.

Fig. 5c. After the final operation.

INDIOSYNCRASIES OF SCARS

Like individuals, scars have their own idiosyncrasies. When they occur in the region of the ears or involve the ear tissue or the upper part of the chest, they have a marked tendency to become keloidal in appearance. Scars about the orbit, especially if parallel to the lines of Langer, become practically invisible, and in a much shorter time than those situated in other localities. Following operative procedures for the removal of paraffinoma, regardless of the part of the body in which they occur, the scars are slow in healing and until all paraffin is removed produce thickened welts. The tendency to keloid-like scar formation about the ears as compared with other regions of the face and body is illustrated by Figure 7. Here it will be seen that the scar above the brow is very slight, while as it approaches the ear tissue it becomes more pronounced in its keloid-like appearance. Furthermore, the scar above the brow follows Langer's lines of tension and is markedly small as compared to the portion external to the orbital angle. Keloid-like thick-

Fig. 6. Angular scar, showing collection of fatty tissue in the angle of the scar.

Fig. 7. Example of keloid-like scar formation about the ears, less pronounced above the brow.

Fig. 8. Example of a motheaten scar.

Fig. 9. Parffianoma scar, referred to the author. This type of scar is not unusual in these cases following preliminary operations to remove paraffin. This case was not due to faulty technique on the part of the operating surgeon.

ening is likely to occur as the result of any accidental injury in this region.

OPERATIVE TREATMENT

In the removal of any scar, when it has once been decided that it can be effaced or rather that it can be minimized to what we are pleased to call a hairline, the method of procedure depends upon whether one plans to introduce a transplant or a graft, or simply to draw the surrounding skin together after the scar has been removed. In any case in the excision of the scar it is always advisable to make all incisions in healthy skin that is entirely outside of the scar tissue. If grafting is to be employed, undercutting of the surrounding tissues is undesirable, as it may invite bleeding, with the formation of a blood clot beneath the graft or transplant. If on the other hand it has been decided that a transplant or graft is unnecessary, and one plans merely to excise scar tissue, the more undercutting that is done the easier it will be to correct the defect. Whatever incision is made around the scar should be made with an oblique-cutting scalpel (Fig. 1). If sutures are found to be necessary, whether between graft or transplant and the surrounding skin, or between the healthy skin edges of the wound which have been drawn together over the area formerly occupied by the defect, they should be subcuticular in character. The suture material which has given me the most satisfactory results is horsehair.

At the completion of the operation powdered turtle bile should be dusted along the wound edges and, if a wound is on the face, no dressing should be applied; the patient should be instructed to expose the wound after the first twenty-four hours to air and sunlight. During the first twenty-four hours an ice-bag should be kept constantly over the operative field. This measure prevents infection and congestion with its consequent hemorrhage underneath the graft or between the wound edges. It also diminishes the pain that might otherwise be present. The patient is seen daily and at each sitting the wound is saturated with a 2 per cent solution of thiocyanate in physiological saline solution. This preparation is made from the saliva of a healthy dog.

This mode of treatment has yielded remarkably satisfactory results in my hands. If the patient has a tendency to keloid thickening, either from tuberculous diathesis, keloid diathesis or any other unknown reason, this usually begins to manifest itself in from two to three weeks after the operation. The patient should then be referred to the electrotherapeutist who can successfully reduce the thickening, in one or two treatments by using the static brush discharge.

CONCLUSIONS

Not all scars should be subjected to surgical treatment. An obsession relative to a scar, syphilis, a tuberculous or a keloid diathesis, a temporary bronchial affection or other constitutional disease may make it unwise to undertake a surgical procedure.

The result in corrective surgery about the face and neck is more or less dependent upon the location of the scar. More pleasing results are always secured, other things being equal, when incisions follow Langer's lines of tension.

The treatment of scars must take into consideration both the type of scar and its etiology.

The procedure adopted for the elimination of a scar may require grafting, the transplantation of tissue, or simply excision of the scar, with undercutting and approximation of the wound edges. The latter is the preferable procedure under suitable conditions.

The after-treatment of a wound is fully as important as the surgical procedure itself. It includes dusting the wound with turtle bile, the application of cold, exposure to air and sunlight, and the daily application of a 2 per cent solution of thiocyanate in physiological saline solution.

Careful attention to the details described make it possible to minimize or practically efface the vast majority of disfiguring scars.

FRACTURED FEMUR

THE PATIENT'S POINT OF VIEW

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FIVE weeks ago I fractured my femur and in due time found myself in St. Luke's Hospital, flat on my back burdened with weights, rope, Thomas splint, etc. The alignment is fine, there is no shortening and the roentgen-ray check-up shows everything going strong.

I have treated many fractures of the femur, and have roentgenographed many more for my associates. My mind was always concentrated, as it should have been, in getting good results, sometimes forgetting, I fear, to provide the greatest possible comfort for the patient. But now, from the patient's standpoint, I am thinking more of the physical well-being and condition to be had during all the weary weeks. These factors are usually left to the nurses and orderlies. Not that the surgeon is unsympathetic but he simply has little time to spend in consideration of detail pertaining to the personal care of the patient.

Being a physician as well as a patient, I have devised several things that have mitigated my suffering and at the same time relieved the nurses and orderlies of all heavy work.

A suspension frame of the type designed by Dr. H. H. M. Lyle (often miscalled a Balkan frame) and used generally in the Allied armies, was erected about the bed. On top of this frame I had the hospital carpenter lay two pieces of "two by four" running parallel from head to foot. These pieces are about two feet apart. A sliding cross-piece holds two double pulleys which hook in a canvas sling. With this sling I easily raise myself on a bedpan or place myself on a hair pillow, so that the gluteal region may be massaged and rested. I sometimes maintain this position for an hour, until all pressure pain is eliminated. A set of pulley blocks above and at the foot of the bed with a belt around my back under my shoulders allows me to pull myself up into a semi-sitting position. This greatly facilitates massage and care of the back. All changes of position are effected by myself with no lifting on the part of nurse or other attendant.

For the first few days my favorite indoor

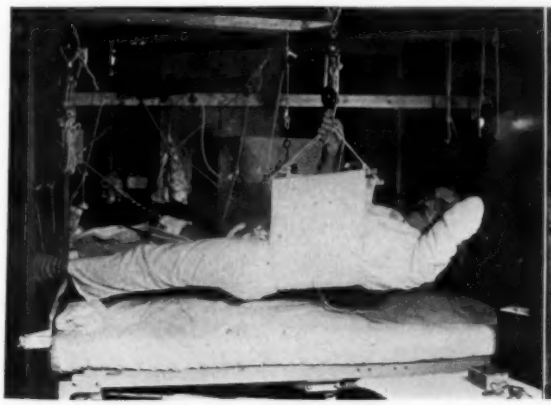

FIG. 1. Illustrating apparatus by means of which patient may lift himself or easily be lifted several inches above the level of mattress. The advantages are obvious.

FIG. 2. Showing device whereby patient can raise himself or be brought to sitting posture. The ability to remain comfortably in this position greatly facilitates massage and care of the back.

sport was being dragged down toward the foot of the bed by traction weights, and then with the help of two suspended handles and my good leg, getting back to the head of the bed for a fresh start. To prevent sliding I first had a wooden rest made to fit between my good hip and the foot of the bed. I later found three ten-pound sand bags backed by an air cushion more satisfactory, both from the point of comfort and to prevent sliding. These hold me in any position I care to assume with reference to the foot of the bed. A ten-pound weight tied to the ring of the Thomas splint and supported by a pulley attached to the superstructure prevents the ring from dropping backward when I am elevated in the canvas sling.

At night I sleep on a small air mattress, two by five feet. This affords a change from the ordinary hospital mattress and is most valuable in obtaining sleep. Other small things which would take too long to describe have been added from time to time.

The devices mentioned have meant everything to me in this long grind. Except for the first few days there has been no painful, uneven lifting by orderlies with tilting of the pelvis, no dropping back of the Thomas ring, no bad night with backache, and no chance of bed sores.

I feel that many elderly patients might be saved and that the younger ones might be made comparatively happy by these simple devices.

RUPTURE OF THE CRUCIAL LIGAMENTS IN THE KNEE JOINT

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THIS uncommon injury is produced by complete dislocation of the tibia on the femur, forward, backward or laterally. Sometimes a forcible backward hyperextension snapping of the knee causes it.

Symptoms. This injury causes immediate marked effusion into the knee joint. Objective evidence of a dislocation is marked. In diagnosing crucial rupture, the knee is flexed at an angle of from 45° to 90°, with the foot resting on the floor or table. The examiner then grasps the shaft of the tibia with both hands, and manipulates the tibia backward and forward on the femur. If the crucial ligaments are ruptured, preternatural play exists, both backward and forward (Fig. 1). The roentgen ray is a valuable supplement to the symptoms in the making of a diagnosis.

Treatment. Conservative treatment consists in early application of a plaster cast from the foot to the thigh, with the knee in a position of 20 degrees' flexion. This position is the best for rapid healing. The cast should be allowed to remain on for at least two months. Passive and active motion and massage are then begun. After removal of the cast for the following two months the patient should not be permitted to walk or indulge in weight-bearing without the aid of a knee cage (Fig. 3). The knee cage controls the lateral stability of the knee and at the same time limits flexion. It should be worn for at least six to eight weeks. At the end of this time, if there is no play at the joint, the crucial ligaments can be considered as healed. The physician can then help the patient to regain strength and stability by instructing him in the re-education of the quadriceps muscles. Voluntary contraction of the quadriceps from the relaxed stage should be practiced as many times a day as possible with the limb in the position of extension. If this is done the stability of the knee very quickly returns. Voluntary contraction is practiced with the patient standing upright, the affected limb held straight. In a month and a half to two months after this re-

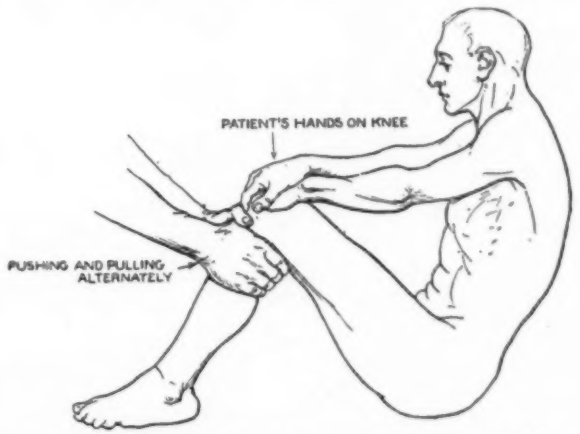

FIG. 1. Determining acute rupture of the crucial ligaments.

education is begun, the patient can return to work.

It is claimed by some orthopedic men that the patient, through proper muscular education, can develop a compensatory function which obviates the use of the crucial ligaments altogether. In a patient employed in heavy manual labor I greatly doubt whether this is possible; first, because of the muscular atrophy that follows this injury, and second, because heavy weight-bearing demands the use of the strong crucial ligaments.

Prognosis. The period of disability without operation extends over approximately four months The prognosis must

be guarded, however, since a chronic ruptured condition may establish itself, in spite of all non-operative attempts at healing (see the following section).

CHRONIC RUPTURE OF THE CRUCIAL LIGAMENTS IN THE KNEE JOINT

This much-discussed condition commonly follows a dislocation of the knee, due to the fact that under the treatment described in the preceding section the crucial ligaments fail to heal.

Treatment. In one chronic case I repaired the anterior crucial ligament by means of an operation based on an anatomical study and tryout. In view of the fact that following the operation this man has been working steadily for two years with an almost perfectly functioning limb as a coal passer the technique of this operation may be of help to other surgeons.

Preoperative Preparation. To begin with, prior to operation the physician should satisfy himself that the patient is a good surgical risk, because the operation consumes at least one and one-half and usually two hours. The patient, then, must be strong enough to withstand the strain of a long period under anesthesia.

The limb should be scrubbed from the thigh down to the toes, on the night before operation. It is then shaved and washed with soap and water, followed by plain water. Ether or alcohol is then used, and a mild bichloride dressing applied from the perineum down to the toes. This is left on all night. In the morning a quarter of a grain of morphine and $\frac{1}{150}$ grains of atrophine should be administered half an hour before the anesthetic is given.

Operative Technique. This operation, in which the Lane technique is followed rigidly, is conducted entirely under the control of a tourniquet, so that it is practically bloodless. The limb should be painted with iodine followed by alcohol from the point of the tourniquet, which is applied at the upper and middle third of the thigh, down to the ankle. The limb must remain exposed from the line of the tourniquet to four or five inches below the patellar tendon. The primary stage is done with the limb extended on the table; the remainder of the operation is carried out with the knee flexed over the end of the table. (Fig. 2, A and B.)

A lengthwise incision is made on the outer side of the thigh, extending from the junction of the middle and upper thirds, down to the knee. It is then carried around and below the patella, to its inner side. This incision permits of subcutaneous dissection. The entire flap is turned back, thus allowing complete exposure of the fascia and the patella. The knee cap is sawed perpendicularly through to the inner surface. Upon reaching the inner surface a broad chisel is inserted and the inner surface of the patella fractured. An incision is made from the point of fracture upward through the quadriceps, a distance of three inches. Another one is made lengthwise from the lower margin of the fracture, extending downward in the patellar tendon toward insertion. The patella is drawn apart with retractors and the ligamentum mucosum severed. Occasionally one will find the ligamentum mucosum already ruptured and atrophied, in which event no further attention is necessary.

At this point the limb is dropped over the end of the table and flexed to a right angle. With the knee flexed the two fragments of the fractured patella naturally draw still farther apart. (In the first case on which I operated, I discovered at this point that the posterior crucial ligament had healed, but the two ends of the anterior crucial ligament were lying free in the knee joint.) A subperiosteal resection is done on the inner side of the tibia and also a subperiosteal resection under the cruraeus of the femur at the external condyle. By means of a Murphy drill a hole is made up through the inner head of the tibia, coming out through the long axis of the remains of the anterior crucial ligament. After retraction of the cruraeus, a hole is drilled

on the outer side of the condyle of the femur, down to the long axis of the ligament. An incision is then made on the outer side of the thigh and a strip of fascia, about 10 inches in length and 1½ inches in width, is removed. A silk ligature with a carrier is attached to one end of this strip, and passed through the upper opening down through the axis of the ligament, coming out at the lower opening of the tibia. The limb is then flexed at an angle of 20 degrees, a position which takes up the normal tension of the ligament leaving approximately one inch exposed at either

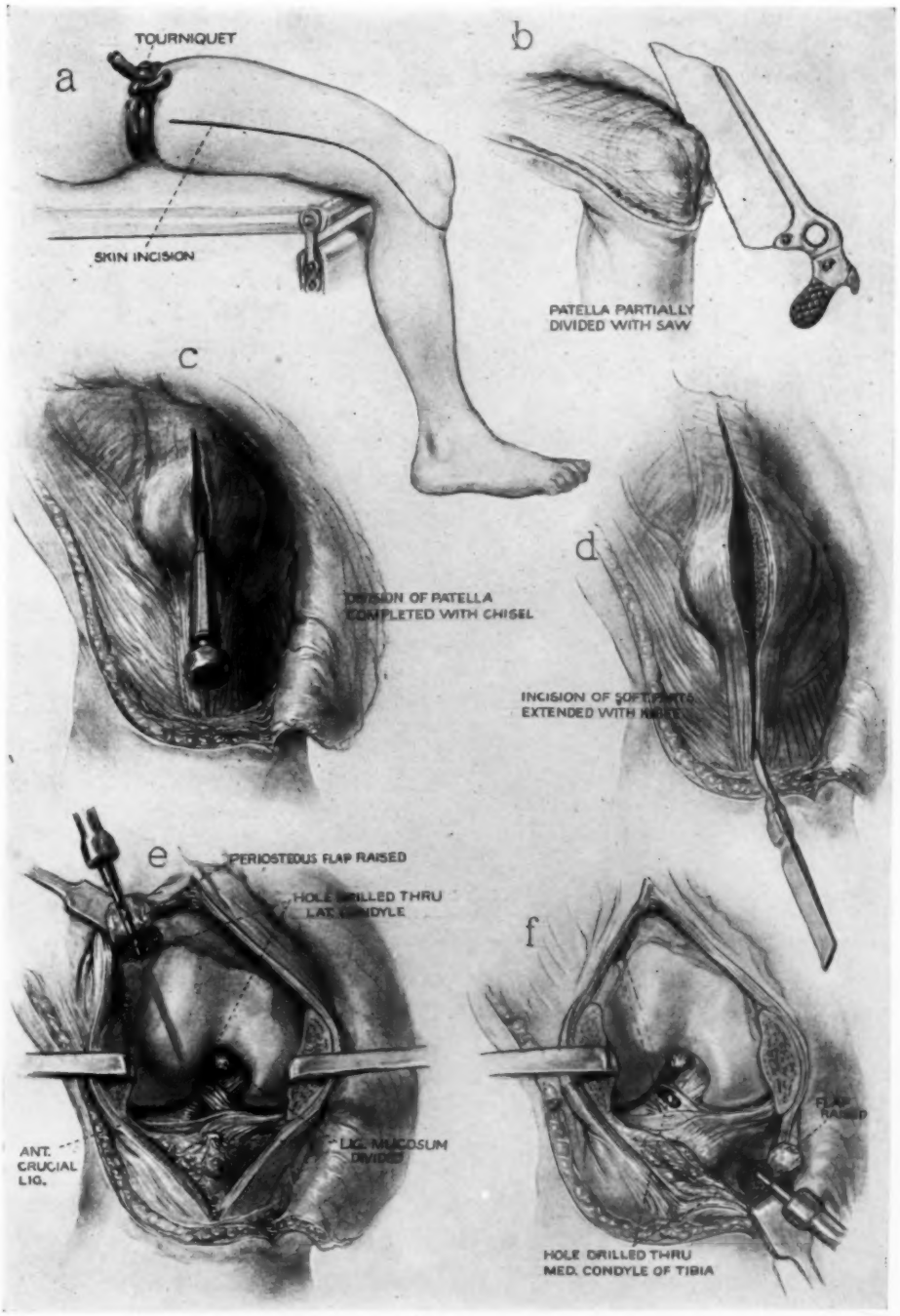

Fig. 2a.

end. The parts of the ligament left exposed are laid flat on the bone and can be either sutured to the periosteum or covered with a trap door of bone. The entire joint is now saturated with a combination of sterilized powdered iodoform combined with ether, using approximately 1 ounce of the powder to 2 ounces of the liquid. The cruraeus muscle is now sutured over the exposed ends of the false ligament. The periosteum of the condyle and the periosteum of the tibia are next sutured with No. 0 pyoktanin

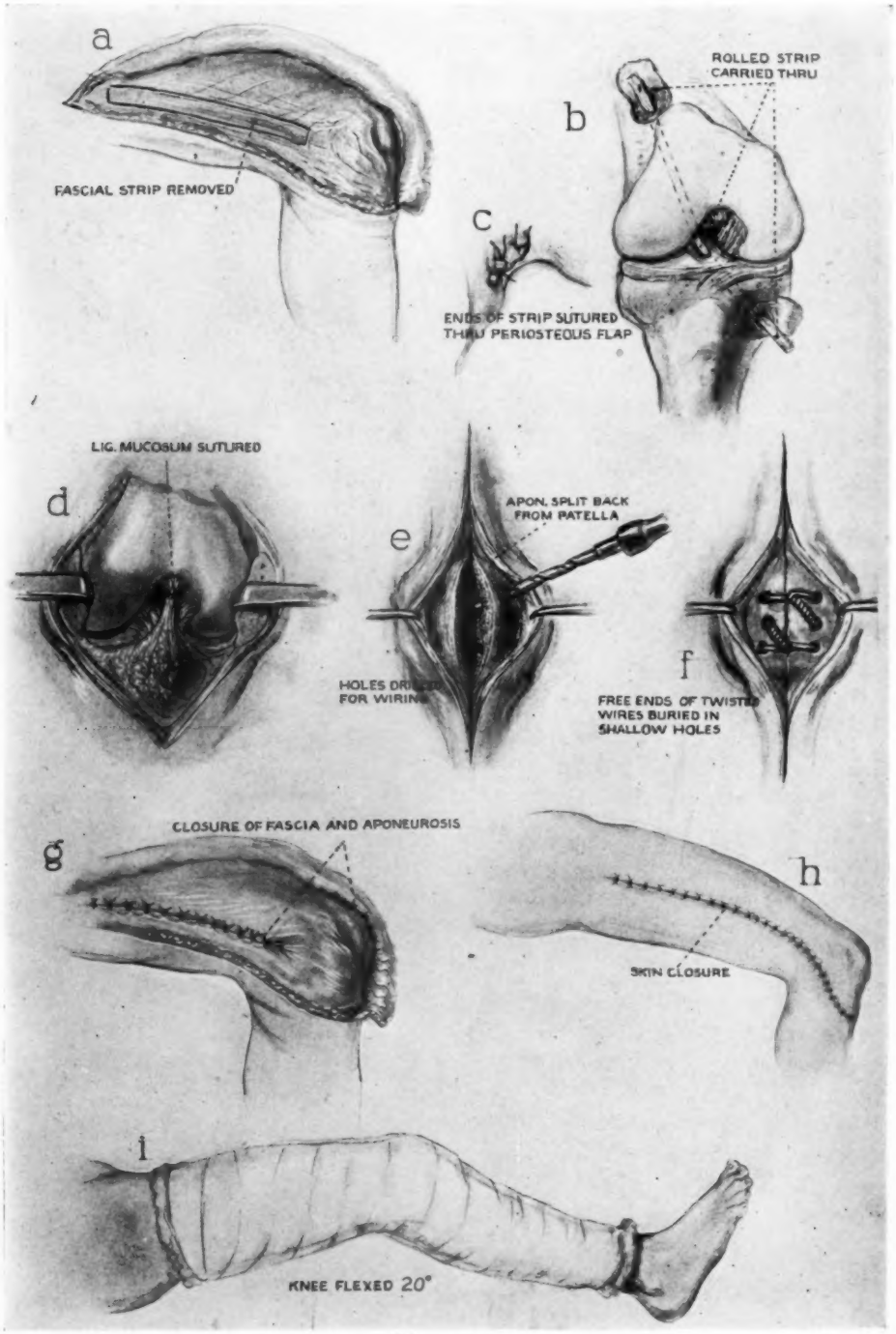

Fig. 2B.

catgut. A No. 00 pyoktanin catgut is used to repair the ligamentum mucosum when necessary, and the patella is wired with two transverse wires. Since working out this operation and performing it on two other cases I have found it is not necessary to use wire in the patella, as a line of kangaroo in the aponeurosis is sufficient. The quadriceps and patellar aponeurosis are sutured with medium kangaroo tendon. The line of incision on the side of the limb is closed with No. 2 interrupted pyoktanin catgut, and the skin layer closed with interrupted silkworm sutures.

After the tissues are closed a plaster cast is applied from the thigh to the toes, with the limb still maintained in a position of 20 degrees' flexion. I wish particularly to emphasize that this is 20 degrees. The cast should remain on for at least six to eight weeks followed by the wearing of a knee cage (Fig. 3) for two to three months together with quadriceps education.

In my first case, the patient returned to work three and one-half months after operation, and suffered no loss in his earning capacity. At the present time there is only very slight play in the knee joint. The patient cannot flex his knee completely; he can flex it to an angle of something more than 90 degrees, and can extend it fully.

The first case operated on was in 1922, since which time two other operations have been equally successful.

I do not offer this operation as a certain cure for every case of chronic rupture of the posterior and anterior crucial ligaments. All I can say is that it has brought about satisfactory results in the case of my patients. In view of the fact, however, that my first case has been kept under observation for three years, and now has a knee joint that functions very satisfactorily, I feel justified in describing the technique of the operation in order that other surgeons may at least give it a trial.

Prognosis. Unless an operation such as is described above is employed for the relief of this condition, the patient suffers serious permanent functional disability. I seriously doubt whether, especially in patients whose work calls for much weight-bearing, the education of muscles that may compensate for the crucial ligaments can be successful. The operation described may on further trial be found to offer hope of a good functional result after four months of postoperative treatment.

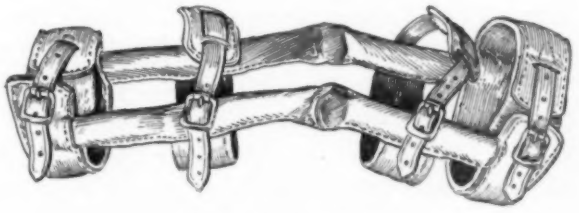

Fig. 3. Knee cage.

As to the posterior crucial when not healed, I am unable at this time to offer any operative solution. However, even where both anterior and posterior are ruptured and fail to heal, I feel sure that the building of an anterior crucial alone would be of significant assistance to the patient.

THE RESULTS OF PUNCH PROSTATECTOMY*

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SYMPTOMS of urinary obstruction presumably due to prostatic hypertropy are frequently out of proportion to the amount of prostatic enlargement palpable on rectal examination. In such cases a cystoscopic examination may show that the symptoms are due to hypertrophy confined entirely to the median lobe of the prostate or to the subcervical group of glands described by Lowsley. More frequently they are caused by bar formation at the neck of the bladder, the result of inflammatory changes in the mucosa and underlying prostatic tissue. Guthrie first called attention to these changes in the neck of the bladder a century ago in a lecture before the Royal College of London. He pointed out that because the symptoms are analogous to those resulting from prostatic hypertrophy, many attempt to treat the obstructing bar as a hyperplastic process instead of as prostatic atrophy with inflammatory changes, which Randall has so clearly demonstrated it to be. He mentioned the frequency with which small sclerotic prostates are removed and said "that to drag from its bed the atrophic adherent and sclerotic tissue which frequently forms part of the condition of median bar formation is an operation taxing not only the energies but the utmost skill and anatomical knowledge of the operator; while the dangers from injury to antiguous structures by hemorrhage and the actual failure to sometimes remove anything should contraindicate such a procedure."

TECHNIQUE

To perform complete prostatectomy in order to remove such a comparatively small amount of obstruction has seemed illogical to many urologists, including Young, who has said, "the amount of tissue removed at suprapubic operation is so small that it seems ridiculous to have to perform a major operation for its removal." In 1909, following an unsuccessful attempt to cure a patient with median-bar obstruction by suprapubic prostatectomy, Young devised the median bar excisor by modifying his urethroscope. An opening was made in the wall of the urethroscope to engage the bar formation and a circular knife of a diameter slightly smaller than that of the instrument constructed, which punched out the obstructing tissue. Although Young reported 156 cases treated before 1917 using this instrument, and in his recent book reviews a series of 355 cases, the operation has never met with the popularity that it deserves. There are two possible reasons for this, the fear of uncontrollable postoperative hemorrhage and the necessity for performing the operation without adequate vision. It is true that the small portion of tissue to be removed can be seen by reflected light through the shaft of the instrument as it projects through the opening, but its position and relationship to other structures are not discernible because the instrument has a closed end and no direct illumination. Without a visible field, unless the operator is expert, it is evident that the base of the bladder, trigone or triangular ligament might easily be cut instead of the median bar.

In 1918, Braasch, in an endeavor to overcome this objection, modified his direct cystoscope so that the operation could be carried on under vision. The

* Read before joint meeting of Los Angeles Surgical Society and Symposium Society, Dec. 2, 1927.

modification consisted, as in the Young instrument, of a window in the lower wall of the direct cystoscope close to the distal end. As the lamp was retained and the distal end left open, the operator was able to see the tissue to be removed not only as it entered the window, but also prior to its engagement and in relation to all other adjacent structures. The dilatation of the urethra and bladder with water makes the removal of multiple portions of the obstruction easy, as the bleeding field is kept free from clots, a complication that greatly handicaps an operator using the other type of instrument. To overcome the frequent objection of complicating hemorrhage, Caulk, in 1920, modified the Young punch so that a cautery blade was substituted for the circular knife and to this modification and its author must be given the credit for the recent popularization of the operation, which he believes is suitable in 40 per cent of all cases of prostatic obstruction.

REVIEW OF CASES

As these two authors are the only ones who have reported any considerable series of cases treated by this method, it seemed that a review of the results obtained at at the Mayo Clinic in a series of 192 cases in which the different types of instrument were used would be of interest. One hundred fifty-three of these operations have been performed since January, 1924, during which period 895 prostatectomies were performed, either perineal or suprapubic, a ratio of 1:6. It has frequently come to our attention that many members of the profession are quite sceptical of the permanency of the results obtained from a punch operation. This review should be of interest in determining whether it is merely a palliative measure, giving relief for a short period until subsequent prostatectomy becomes necessary, or is a satisfactory form of treatment for a selected type of case.

During 1914, 1915 and 1916, ten operations were performed with Young's instrument. As the procedure was new, it is probable that the group was not well selected, for at that time the limitations of the operation were not appreciated as well as now. As a result, it was necessary to perform prostatectomy subsequently in two cases, in one a few weeks after the punch operation, and in the other a year later. In each case the tissue removed showed only chronic inflammatory changes without adenomatous hypertrophy. It has been necessary to perform prostatectomy in seven other cases (4 per cent) of the remaining 182 in the series. In four of these the operation was performed within a month of the unsuccessful attempt. One was performed four months later, the other six months later. In the last case the patient was advised that subsequent prostatectomy would be necessary because of hypertrophy of the lateral lobe, but he did not return for the operation until a year later. These unfavorable results bring up the point as to whether glandular enlargement or true inflammatory fibrous conditions are most likely to react disappointingly to treatment. Keyes writes: "It is the fibrous rather than the adenomatous obstructions that will—shall we say immediately recur or immediately not be relieved? It comes to much the same thing because the scar has not been wholly divided." Taking the opposite view, Frontz states: "Personally I do not feel that it is an operation which should be done for prostatic adenoma." In this group of nine cases in which a second operation was performed the pathologic reports showed inflammatory changes predominating in seven; in only two was the enlargement due to adenomatous hypertrophy. More important, in our opinion, than the type of enlargement is the presence or absence of intraurethral enlargement of the lateral lobes. If they are enlarged the removal of a portion of the median lobe will simply tend to exaggerate the lateral hypertrophy by permitting the lobes to fall together and overlap. In seven of these nine unsuccessful cases such enlargement was noted and undoubtedly explains the failure.

If the enlargement is adenomatous and confined entirely to the median lobe we

believe that a better prognosis is warranted than if it is due to chronic prostatitis. Such limitation of hypertrophy is rare; furthermore, in only twenty-one of the 160 cases in which the tissue was examined microscopically was adenomatous hypertrophy noted, and then it was usually associated with chronic prostatitis. In 126 cases the prostatic tissue was inflammatory, showing most emphatically what type of enlargement is best suited to this form of treatment. With one exception subsequent prostatectomy was not necessary in any case more than six months after the operation, a fact that emphasizes the statement of Caulk that "if a man remains well for six months he usually will remain well forever."

From 1916 to 1922 the instrument designed by Braasch was employed in twenty-eight cases. In three of these cases it was used to remove remnants of prostatic tissue that obstructed the posterior urethra following previous prostatectomy. In each case the tissue removed showed adenofibromatous hypertrophy on microscopic examination. This complication following prostatectomy is seen only too frequently and usually, as in these cases, occurs following a two-stage operation during which the gland has been removed without adequate exposure through a dilated suprapubic sinus. The persistent sinus after the second operation is a distressing complication to both patient and surgeon, for there is considerable risk in subjecting such a patient, usually advanced in years, to further surgical procedures before he has fully recovered from the previous operations. The punch operation offers a happy solution to the difficulty, for the prostatic bed can be satisfactorily seen, and the obstructing portions of the gland remaining easily removed; usually the suprapubic sinus will close without further treatment. This procedure was followed in this series of cases six times, in four successfully with permanent closure of the sinus. In ten other cases it was performed for the relief of symptoms of obstruction following previous prostatectomy without persisting sinus.

The removal of the obstructing portion of a prostate with recurring malignant disease offers still another field of usefulness for the punch operation. If the obstructing portion of the growth is removed the patient is saved from constant use of a catheter often quite as distressing and aggravating as the slowly growing neoplasm. In fact the procedure should not be confined to the recurrent malignant lesions, but may be used as a valuable palliative and preliminary measure in many cases of carcinoma of the prostate. It was so used four times in this series and could undoubtedly have been applied advantageously much oftener. How gratifying the results may be when it is used as an initial procedure in cases of carcinoma of the prostate was illustrated in the case of a patient who died recently. In February 1925 he came to the Mayo Clinic complaining of frequency and dysuria. At rectal examination it seemed that the malignant process had extended to the seminal vesicles, but at cystoscopic examination it appeared to be confined to the median lobe of the prostate. A punch operation was performed and from the time of his dismissal from the hospital two weeks later until death, there were no urinary symptoms. At necropsy the bladder showed none of the deformity usually associated with urinary obstruction and, although the portion of the gland removed showed carcinomatous change, the neck of the bladder was completely healed and covered with normal mucous membrane. There was much extravesical metastasis, several of the ribs and one or two vertebrae being completely replaced by neoplastic tissue. Although the patient suffered much pain from these metastatic processes, he was saved the discomfort of constant urinary obstruction, and his family were spared the necessity of providing adequate catheterization during a period of nearly two years.

In 1924, because of excessive bleeding in several cases treated with the knife punch, in two of which transfusion was required, we commenced using Caulk's cautery punch, and employed it in the next eighty-

one consecutive cases, with but four exceptions. In these four cases previous operations or deformity of the neck of the bladder necessitated accurate vision which cannot be obtained with the cautery instrument.

The cautery, when properly used, does prevent immediate postoperative bleeding, which is a strong argument in favor of the cautery punch. The portions of gland obtained are sufficiently large to account for all obstructing tissue if several bites are taken. It does, unfortunately, have several objectionable features, the least of which is the occasional late bleeding occurring one or two weeks after the operation, when the slough comes away. This, in our experience, was usually more alarming to the patient than serious. When we began its use we noticed a high incidence of complications resulting from secondary infection. It would seem that the burned neck of the bladder required longer to heal than one that was incised and, until healing had occurred, was more likely to acts as a focus for ascending urinary infection. The frequency of acute pyelitis following the cautery operation seemed to bear this out, as there were twenty-six cases in which febrile reactions lasted four days or longer; in all but seven fever began on the day of operation. As this represents almost a third of the cases in which operation was performed with the cautery punch, it seemed to us that secondary infection was a serious complication and we discontinued the use of the instrument. Since then we have performed sixty-nine operations with Braasch's instrument and in only ten has there been a febrile reaction lasting for four days or longer, one-half as many as occurred when the cautery instrument was used. The most serious disadvantage of Caulk's instrument, that determined us to change to another type, was the obscurity of the field of operation. In reference to this Young states that in practice he has found the observation of the tissue projecting through the fenestra entirely unnecessary, as with experience one may be certain as to the portion of the prostate which has been caught within the tube. Caulk, on the other hand, is equally emphatic concerning the necessity of preliminary inspection of the tissue to be excised if trauma to other portions of the bladder or urethra is to be avoided. He writes: "With my punch technic it is perfectly easy to have a thorough vision of the bladder neck and I personally have no trouble in discriminating between bladder and orifice. One can under perfect vision rotate the instrument in different segments of the bladder neck and remove whatever obstruction presents. I can tell not only the bladder neck, but the type of orifice, whether glandular or sclerotic."

Feeling that vision which is confined simply to the tissue which projects into the window of the instrument was of negligible value, we followed the teaching of Young and depended on "feel" to determine the position of the instrument. In this we were in error, for in one case the urethra and in another the wall of the bladder was penetrated. Young reports a similar accident in his series of 355 cases, although it did not occur at his hands. We have since learned that our clinics are not unique in experiencing these unfortunate accidents.

When the cautery punch was abandoned, we formed the habit of examining the patient with the cystoscope immediately after completing the operation with the knife punch. This makes it possible to detect the bleeding points and, by applying a small electrode through the catheter guide, to stop the bleeding by electrocoagulation (Fig. 1). Tolson has perfected an isulated shaft for use with the Young punch for the same purpose, with a contact point that just fits the window. This electrocoagulates the entire excised area rather than just the bleeding points, and for this reason has the objections inherent to a cautery of producing an excess of charred tissue. Since adopting the electrocoagulation method of controlling hemorrhage, we have had difficulty but three times. In one of these cases hemorrhage was controlled by further electro-

coagulation; in the other two cases the bladder was too full of clots to permit of cystoscopic examination and cystostomy was necessary, not alone to control the bleeding, but also to remove the clots. The other cases have been absolutely free from all signs of bleeding except for slight discoloration of the urine for the first day or two. No method of hemostasis is employed, such as an indwelling catheter or bag. In fact, we have come to believe that the presence of any foreign body in the urethra tends to stimulate sphincteric action and leads to hemorrhage. The patient is kept on the operating table until the irrigating fluid is clear, which occurs as soon as the last bleeding vessel is touched by the electrode.

FIG. 1. Producing hemostasis by electrocoagulation.

Caulk has recently reported his final results in 323 cases in which prostatic symptoms have been relieved in 80 per cent. Young had equally good results in his series of 355 cases.

SUMMARY

In the present series of 192 cases definite information is available in eighty-five of the 157 in which operation was performed prior to January 1, 1927. Twenty-seven patients (32 per cent) have had no urinary complaint since the operation. In thirty-nine cases (46 per cent) there is improvement in the symptoms of obstruction, although there is a degree of frequency which is definitely less than before operation; therefore, in a total of sixty-six cases (78 per cent) there was improvement; in nineteen (22 per cent) no improvement. A review of the data in these cases previous to operation may throw some light on the cause of failure. In nine of the nineteen unimproved subsequent prostatectomy was performed and lateral lobe enlargement discovered; in seven others there was hypertrophy of the lateral lobes in addition to the median obstruction. In all but two of the nineteen unsuccessful cases the pathologic diagnosis of the tissue removed was "inflammatory." This would indicate that in groups of cases of atrophic inflammatory prostatic obstruction, considered best suited for the punch operation, the poorest results were obtained; however, one must not overlook the fact that such cases not only offer technical difficulty but are notorious for the disappointing results following total prostatectomy.

In all of the cases in which treatment was a failure (except three), symptoms have persisted following operation or recurred within six months. In the three exceptional cases there was no recurrence of trouble until from ten to twelve months later. This would again emphasize the belief of Caulk that a patient's condition a few months after operation is a fair indication of the final results of the operation.

We have heard from twenty-six patients operated on last year. The Braasch knife instrument was used in all of these cases and the bleeding points subsequently electrocoagulated. Fourteen of these patients are entirely relieved, ten are definitely improved, and two are no better. We believe these figures are fairly indicative of the percentage of relief obtained by using the punch operation in any properly selected series of cases.

CASE REPORTS

SPINDLE CELL SARCOMA OF SOFT PARTS OF CALF AMPUTATION; PATIENT WELL FIVE AND ONE-HALF YEARS LATER*

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R. A. age eleven. Male, schoolboy. The patient was admitted to the Memorial Hospital, September 22, 1921, referred by the New York Orthopedic Hospital. At that institution he was first seen in March, 1921, at which time he complained of pain in his left knee. There was a firm mass on the inner side with limitation of motion in the joint. Roentgenogram at that time showed a partially calcified mass on the inner side of the joint. An operation was performed by Dr. Hibbs in April, 1921, and a somewhat gelatinous mass was removed. The joint was fused. Two similar masses appeared in the same region. Tissue from the original tumor was reported to be spindle cell sarcoma.

P. H. When the child was eighteen months of age he fell and hurt his left knee. Shortly thereafter a small lump appeared at the site of the injury. This gradually increased in size and was excised. Pus was said to have drained from the wound. The lump recurred and increased in size, causing pain which radiated to the bone. This condition existed until three years prior to admission, when the growth was excised. A recurrence was noted six months later which was followed by another removal. Several recurrences took place, the last being the operation at the New York Orthopedic Hospital.

P. E. On admission, examination showed a boy of eleven who was unable to walk because of pain in the left knee. His heart was moderately enlarged and over-active. His lungs and abdomen were negative. In the inner aspect of the left knee there were three soft, fluctuating swellings, each about 2 × 2½ c.m. in diameter, exquisitely tender. The slightest motion of the left knee was painful. There were two or three rather soft lymph nodes in the left femoral triangle. The provisional diagnosis was spindle cell sarcoma of the soft parts of the left knee.

Films made on admission to Memorial Hospital revealed evidence of complete ankylosis; there was no bone destruction and the roentgen features of a bone tumor were absent. Films of the chest did not reveal evidence of metastases.

The boy was treated with three radium packs during the week following his admission. These were given over the inner, outer and posterior aspects of the knee. Because of a definite increase in the size of the tumor amputation was advised four months later.

Operation. Amputation midthigh was done on February 2, 1922, under gas and oxygen anaesthesia.

Pathological report very cellular small spindle cell sarcoma, probably neurogenic by Dr. Ewing.

Postoperative Course. Following the operation, the patient's progress was good and he was discharged from the hospital on the nineteenth postoperative day.

A roentgenogram of the stump six months after showed a small sequestrum which apparently was absorbed, as it never had to be removed and the wound remained healed. Patient was seen in the Followup Clinic 23 times in the following four years. After amputation he received two 15 minute exposures of low voltage roentgen ray to the stump and several injections of mixed toxins. No other treatment was given and he is now shown well 5½ years following the amputation.

This case brings up the following points of interest:

(1) A history of recurring tumors which had been repeatedly excised, the last operation being an extensive resection of the

*Read before Section of Surgery, New York Academy of Medicine, Nov. 4, 1927.

knee joint; yet the multiple operations did not result in a widespread dissemination of the growth despite the fact that the tissue was reported to be a very cellular small spindle cell sarcoma.

(2) The result is satisfactory following amputation five and a half years ago, a fact which should tend to offer some encouragement to surgeons who have similar cases to deal with.

TRAUMATIC RUPTURE OF SPLEEN

SPLENECTOMY; AUTOTRANSFUSION*

Bradley L. Coley, M.D.

NEW YORK

C M. Male. Age, thirty-six. Iron worker. *P. I.* Patient was admitted to Bellevue Hospital, Second Surgical Division, August 30, 1926. Patient states that 1½ hours previous to admission he had fallen a distance of 6 feet, striking squarely on his left side across a wooden brace. He was able to get up and walk, but felt excruciating pain over the region he struck.

F. H. Entirely irrelevant.

P. H. Entirely irrelevant.

P. E. Physical examination showed a well developed adult male, appearing to be in shock. He was restless, his face ashen, mucous membranes very pale, giving the impression of severe hemorrhage. Pupils reacted sluggishly. Mouth very dry. A few abrasions present over the left chest in the mid axillary line. Heart showed a left systolic murmur. Knee jerks sluggish. Abdomen held rigid with marked tenderness in left upper quadrant and in left loin. Shifting dullness was present. Kehr's sign was not obtained.

Preoperative Course. Patient was observed and found to be in shock. Because patient refused his consent, operation was delayed for 3½ hours from the time of admission and five hours from the time of injury. His temperature was 99; pulse 74; respiration 20. His urine was examined and was found to contain some albumin and numerous red blood cells and an occasional white blood cell. His blood count was 32,800 white blood cells, polys 91 per cent, lymphocytes 9 per cent. His blood pressure was 70/58. Two hours after admission this had fallen to 65/47. His condition grew worse. He became increasingly pale and weak. Two and a half hours after admission the entire abdomen was flat to percussion except a small area in the right lower quadrant.

Operative Procedure. Patient was operated on five hours after injury with a preoperative diagnosis of traumatic rupture of spleen. On opening the peritoneal cavity, it was found to be full of unclotted blood. Exploration of the spleen immediately revealed that it was ruptured and that this was the source of the hemorrhage. As far as could be ascertained, no other organs were injured. Palpation of the left kidney showed no laceration. Stomach was normal.

Under gas, oxygen and ether anaesthesia an upper left rectus incision was made. The blood which gushed through the peritoneal cavity was caught in a basin and the spleen was delivered. Its pedicle was clamped between clamps and doubly ligated. Was then tied with plain cat gut ligatures. During this procedure the unclotted blood in the peritoneal cavity was collected in a sterile basin, strained through gauze and when 750 c.c. were obtained, transfused into the right cubital vein by an assistant. This transfusion went along simultaneously with the closure of the abdominal wall and was followed by an additional 300 c.c. of normal saline solution. The abdominal wall was closed in layers, using No. 2 chromic cat gut throughout, with the addition of silkworn gut retention sutures.

Postoperative Course. Patient's condition at the completion of the operation was fairly good. The skin had lost its ashen hue and his pulse was of better quality.

He was transfused that evening, receiving

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500 c.c. from a compatible donor. The postoperative course was unusually smooth. His urine showed a port wine color for one day after operation, then became normal. One week after splenectomy his red blood cells were 2,400,000, his hemoglobin 77 per cent. His wound healed by primary union and he was allowed up on the fourteenth postoperative day and went home on the fifteenth.

Pathological Report by Drs. McGrath and Miles.

Gross. Specimen consists of an averaged sized spleen ruptured in its longitudinal and transverse diameter. The capsule is torn and there is hemorrhage into the spleen.

Microexamination. Throughout the splenic pulp are seen small hemorrhagic areas; otherwise the organ appears normal.

Diagnosis. Hemorrhage into spleen.

This case is shown because of the fact that it recovered after an interval of five hours from the time of accident to time of operation, during which time a very profound intraabdominal hemorrhage had occured. In my opinion the patient withstood the operation better because of the immediate autotransfusion and, while it can not be definitely stated that he would have succumbed without this procedure, it is my belief that it probably saved this man's life.

In a recent report by Dr. Hamilton Bailey of 32 cases of ruptured spleen collected from the London Hospital records in the past thirty years, it is of interest to note the fact that the mortality rate has steadily decreased. Between 1894 and 1914 there were 11 cases with 3 recoveries, whereas between 1914 and 1925 there were 12 cases with 11 recoveries, and the case which died was complicated by a ruptured right kidney.

Dr. Bailey groups cases of ruptured spleen into four classifications: (1) The patient rapidly succumbs, never rallying from the initial shock. (2) Initial shock—recovery from shock. Signs of ruptured spleen. (3) The signs of an intraabdominal catastrophe are delayed. (4) Spontaneous recovery.

The case presented tonight belongs in group 2 of Dr. Bailey's classifications, as did three-fourths of the cases he studied.

STRANGULATED FEMORAL HERNIA

ENTEROSTOMY; LATER ENTEROANOSTOMOSIS WITH MURPHY BUTTON*

Bradley L. Coley, M.D.

NEW YORK

J. K. age, forty-eight. Male. Garage worker. The patient was admitted to Second Surgical Division, Bellevue Hospital, November 5, 1926, with chief complaint of violent and persistent vomiting associated with cramp-like pains in the abdomen, and obstipation. Patient stated that three days prior to admission he commenced to have abdominal pain, although admitting some vague abdominal distress for two weeks prior to this, which he attributed to having pushed a large automobile. Just prior to his admission these cramp-like pains became so severe that he was tied up in a "knot" and was vomiting foul-smelling brownish material.

F. H. Entirely irrelevant.

P. H. Entirely irrelevant.

P. E. Examination showed a well nourished male adult in severe pain, appearing acutely ill. His temperature on admission was 99; pulse 120; respiration 20. His general physical examination revealed nothing abnormal with the exception of a few mucous crackles which were heard over the larger bronchi.

Surgical Condition. The abdomen was moderately distended, somewhat tender and

*Read before Section of Surgery, New York Academy of Medicine, Nov. 4, 1927.

tympanitic. There was generalized muscular rigidity, but not board-like in character. In the right groin, apparently along Poupart's ligament, there was globular mass indistinctly outlined beneath the thick layer of fat. There was some induration about this mass and a faint pink blush of the skin overlying it. It was not reducible, gave no impulse on coughing and was exquisitely tender to palpation. During the examination the patient vomited offensive-smelling brownish material in large amounts.

Blood Count. Leucocytes 25, 350; polys 94 per cent; transitional 2; lymphocytes 4.

Urine Report. Negative except for two plus albumin.

Operation. Patient was immediately operated upon under 1 per cent novocaine. A right femoral hernial sac was exposed which, when opened, revealed a Richter's hernia in which about three-fourths of the circumference of the gut was markedly devitalized. On the contramesenteric aspect a greenish area of gangrene and softening was present. Although no evidence of actual perforation was made out, a distinctly foul odor was apparent when the sac was opened. This hernia represented a type that is often described as an acute partial enterocele.

Operative Procedure. An inguinal incision prolonged downward over the femoral opening was made and the subcutaneous fatty layers overlying the femoral sac were divided and the sac exposed and opened. An attempt was made to draw down the bowel to inspect the gut above the point of constriction, which was unsuccessful even after Gimbernat's ligament was divided, because of the fact that the gut seemed to be on the point of rupturing. The inguinal approach was then resorted to and with the peritoneal cavity opened bimanual efforts to reduce the gut were successful. The patient's critical condition decided the operator against resection and the gangrenous loop was sutured into the upper opening in the peritoneal cavity preparatory to drainage of the bowel. A rubber dam drain was placed in the lower angle of the incision, leading to the site of the gangrenous femoral sac which was previously excised.

Interval Notes. Less than twenty-four hours following the operation, an opening was made in the loop of gut which had been brought outside the adbomen and catheters inserted in both limbs of the U. A prompt and copious discharge of foul-smelling intestinal contents followed by relief of distension and other symptoms of obstruction took place. The abdominal wall quickly became excoriated and an area seven or eight inches in diameter extending up to the umbilicus was within a few days raw and exceedingly painful. Attempts to protect the skin with kaolin and glycerine pastes met with little success and the patient grew weaker through loss of nutrition, owing to the high position of the enterostomy. It was, therefore, decided on November 12, 1920, one week after operation to attempt a closure.

Second Operation. The loop of gut with its opening was easily freed by finger dissection from the adherent muscle circumferentially. Traction on the loop withdrew the gangrenous portion for a distance of 3 inches on the proximal side and 4 or 5 inches on the distal side. This was insufficient on the proximal side, however, to make a suture resection feasible; consequently, the involved section was excised (about 2½ inches of gut were sacrificed) and anastomosis by Murphy button was performed. After the button had been closed, a further supporting peritoneal layer of continuous zero plain cat gut was put in to perfect the serosa to serosa approximation. The anastomosis was then pushed within the abdomen and a large Mickulicz rubber dam tampon was placed in the opening through the abdominal cavity and held by very carefully applied dressings, maintained with many tail binders.

Subsequent Course. Following the second operation, the patient showed rapid improvement. There was no distension and the inflammatory condition of the abdominal skin rapidly yielded to zinc oxide ointment dressings. The Mickulicz tampon was repacked daily and as the wound gradually closed its contents of packing were reduced. It was finally removed and the granulations filled the depression and the wound healed.

Three weeks after the second operation, the patient developed carbuncles on the back of his neck which, on December 1, 1926, were treated in the usual manner by crucial incisions with undermining of flaps. He left the hospital December 13, 1926.

Pathological Report of Femoral Sac. The sac consists in oedematous fat and areolar tissue thickly infiltrated with polynuclear cells. Diagnosis: Acute infiltration, fat and areolar tissue. Culture taken at operation sterile after 72 hours.

Follow Up Note. June 29, 1927. At present the patient is in excellent health and has no subjective symptoms, but examination shows there is a small ventral hernia above the incisional scar. It is unquestionably a hernia through the intermuscular incision through which the gut was brought and the Mickulicz tampon subsequently placed. There is no impulse or other sign of hernia through the femoral opening, despite the fact that no femoral repair was done at operation. The patient was advised to have a Gallie living suture operation for ventral hernia, but refused because he is not sufficiently inconvenienced.

This case brings up the following considerations:

(1) The essential importance of local anaesthesia in strangulated hernia operations.

(2) The value of the combined inguinal and femoral approach in these cases.

(3) The use of enterostomy as a life-saving measure where resection and anastomosis would be likely to result fatally.

(4) The use of the Murphy button for a quick resection, especially where sufficient bowel can not readily be mobilized for suture anastomosis.

(5) The adaptation of the Mickulicz tampon to provide drainage and prevent evisceration.

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EDITORIALS

NECESSITY FOR THE INDUSTRIAL OPHTHALMOLOGIST

DURING the last fifteen years there have been many changes and advances in the field of medicine and surgery, in the latter probably more than in the former. There has been a new order of things surgical, and out of this rearrangement, industrial medicine and surgery have come to the front. This new development is indicated by the establishment of chairs of industrial surgery in several medical colleges, and further by the American College of Surgeons in their traumatic surgery division. All this has been done in recognition of the importance of good medicine and surgery in industrial cases, and probably more to broaden the scale of this somewhat neglected field. Several years ago the younger men were attracted to this branch of practice on account of the quicker and surer, although somewhat smaller, returns, and without the sounder judgment that eye and experience usually give, inferior work and poor results were often met with, probably too often. Then came the gradual reaction; the better men improved the technique of handling these cases; corporations, insurance companies, and the unions put pressure in the right direction, and as a result, today we have a specialty within a specialty. This field of endeavor has in the last few years been brightened by the addition of several of the better general surgeons to its ranks.

With all this progress in the general surgical division, there has been recognised the need for the ophthalmologist who could and would devote his energies to new problems constantly arising. It would be far fetched to say that the field of ophthalmology was divided into a branch similar to industrial surgery, yet it is not too much to say that the average good ophthalmologist often does not get the right viewpoint on the average industrial eye case.

It has been well said that if a man would succeed in industrial surgery, the care of his cases should be governed by equal respect for the patient, the employer and himself. It has been my experience during

the past ten years in the field of industrial ophthalmology that with a few minor exceptions all that the corporation or insurance company asks is a "square deal;" they are glad to pay for a compensable injury, but will fight non-compensable or fraudulent claims to the limit. How often they pay for the latter types, only those in this field of endeavor realize.

The viewpoint of the industrial surgeon and ophthalmologist is somewhat different than that of his fellow practitioner, and necessarily so, as each case must be looked at from both the scientific and economic side. Not only is it desirable to get the best result, thereby conserving vision, but it is also important to get the patient back to work as quickly as possible. This is of benefit to the man as he is less of an economic loss to himself, and the experience rate paid by his employer to the insurance company is thereby lessened. In the average moderate trauma to the eye, it often takes considerable urging on the part of the surgeon to induce the patient to return to work quickly. This of course depends upon several factors. Plasterers at $20.00 a day cannot get back to their jobs quickly enough, in fact they often require reverse English. Plodding laborers and men with anarchistic views are satisfied with a forced vacation with hopes of prolonging it. I personally know of one case in which a man refused to return to work for five months, fraudulently claiming an eye injury, his family and self being dependent upon county charity during the period of "treatment and trial." Patients with eye injuries are ambulatory cases except a small percentage, and the majority of the former class can work while under treatment, if not at the same kind, then some other lighter work. It is of benefit to them from the economic standpoint and also their morale; indirectly it is of benefit to the employer and insurance company.

Very few men do things without a reason, and therefore in the private practice of ophthalmology patients who malinger are seldom seen. When we enter the field of industrial surgery, the positions are reversed. It has been my experience that 70 to 75 per cent of this type of cases do or have a tendency to malinger in varying degrees, and this is not limited to the more ignorant patients either. The desire to obtain something for nothing, or the self-satisfaction apparently felt by "putting one over" the corporation is quite prevalent. I have seen it attempted by school teachers and others of like accomplishment. Among the lower classes, this is aided and abetted by unscrupulous lawyers and ambulance chasers, without the fear of prosecution for perjury or being accessory. Elaborate tests are not needed, the simpler ones being sufficient and more easily demonstrable before the industrial arbitrator. It is my routine in all industrial eye examinations to take the real vision with the malingering test first, and then to give the patient a chance to tell the truth with the naked eyes.

It is not at all uncommon to find borderline cases, congenital errors, conditions dependent upon disease, or those due to previous injury, associated with or without recent compensable injuries. In such cases the history is of little value at times, as there is the tendency toward fraud, and therefore we are ever on the alert for the claims of aggravation of a preexisting condition. Congenital errors of refraction, amblyopia ex anopsia, diplopia unrelated to injury are met with quite often. Trachoma with its multiple complications, catarrhal ulcers, and interstitial keratitis are often brought forward as a claim for treatment and later for specific loss of vision. Presenile or senile cataract in both eyes, alleged to be due to injury of one eye, detachment of the retina in high myopia due to trivial injury, spontaneous vitreous hemorrhage secondary to overlifting are a few of the conditions for which claim is filed and defense is necessary.

There are cases of primary simple glaucoma, specific iritis, and a multiplicity of fundus lesions which result in

varying degrees of blindness, and for which indemnity is asked. Besides these I have had a case of proven self-destruction of one eye for the amount of money awarded in such cases.

It is evident, therefore, that the ophthalmologist in the industrial field spends considerable time in court. Not only when there must he be able to express his findings in the case on trial in a concise, clear manner so that the arbitrator will understand him, but he must also be able to combat properly the cross examination of the opposing counsel. I have seen some of our better medical men made to say about the opposite of what they intended to say, or their testimony changed to such indefinite statements that the case was lost on this account. The ophthalmologist in the industrial field will not be amiss if he understands something of the rules of evidence used in court of law.

Since every eye injury is a potential law suit, the insurance companies now insist that every case be seen by the oculist, thereby fortifying themselves to a greater degree. This routine was not started by the companies for the above reason alone. Five or six years ago it was found by an industrial surgeon of very large experience in Chicago that temporary disability and specific loss could be cut down materially if such cases were seen at once by the ophthalmologist. The last few years have proven his assumption correct, so that fewer eye cases are now treated by the general surgeon in this field. Along with the routine examination, other things were accomplished such as the detection of non-compensable conditions which are found only by the ophthalmologist whose value in such cases is in his court standing and testimony. Conversely, there is occasionally a condition which to a general surgeon appears quite trivial but one that ophthalmologists find to be quite serious.

As in all other lines, as soon as industrial surgery becomes developed, organization is necessary. With the type of cases and the volume of work, naturally a basis of fee comes into use. This has been the cause of much misunderstanding on the part of the ophthalmologist in private practice and the insurance companies. There is merit to both sides of the controversy. I shall not attempt to discuss either, but will say that as an average this type of work has as much if not more remuneration from all angles as that of private practice. In conclusion, I believe that the industrial ophthalmologist is of added service to the patient and of real value to the employer and insurance company. so that now he is a real necessity in this field of traumatic surgery.

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BRITISH LETTER

A VERY instructive debate took place during the last session of the Royal Society of Medicine on the present position of the operative treatment of cleft palate. It must have been very interesting from the point of view of the president, Sir James Berry, who took part in a similar discussion sixteen years ago. Sir James has done pioneer work in England in this particular phase of surgery and has been one of the foremost advocates of the Ferguson or Langenbeck operation.

At the former meeting the main point at issue was the relative value of the turnover flap operation in very early infancy compared with the operation of lateral approximation of the edges of the cleft. The president's introductory remarks are, therefore, of considerable value. He maintains that the chief object in operating upon a cleft palate is to enable the patient to speak intelligently; it is in no sense a life saving operation. A cleft palate does not stop a child from swallowing. The proper way to deal with a newly born infant afflicted with a cleft palate is to feed it properly, preferably with the mother's milk given by means of a teaspoon. It is not a safe or sound policy

to attempt an extensive operation with its attendant loss of blood and sepsis, and it is impossible at this very early stage to perform a lateral approximation operation with a reasonable chance of success owing to the width of the cleft and the lowness of the palatine arch.

It must be remembered that a wide cleft palate at birth becomes gradually narrower as the child grows older. This narrowing is greatly accelerated when the accompanying hare lip is closed within the first few months of life. His practice is to choose sometime between eighteen months and three, or possibly, four years, and he strongly urges the occasional operator on such cases to wait until a much later period, despite the fact that there is a great advantage in closing the defect before the child has learned to speak.

In a really difficult case, such as one involving the soft palate and most of the hard palate, in his opinion it is often a good plan to close the cleft in the soft palate first and to leave the hard palate unclosed for a time rather than to risk failure of the whole line of union by attempting too much. In many such cases, and in some cases of complete cleft, he often leaves the anterior end of the cleft unclosed rather than endanger the vitality of the flaps by severance of the anterior palatine artery. In any operative measure it is most important that the soft palate should be well united, otherwise little benefit will accrue. The aperture in the hard palate can be closed at a later date, or at the worst an obturator can be worn. He refers briefly to some general lines in his treatment which stress the importance of preoperative treatment, particularly the special need to correct gross defects of the teeth and tonsils, and the necessity of making sure that the child is in good general health.

With regard to the position of the patient on the table, he prefers to stand on the right side of the patient facing the head. The patient's shoulders are elevated and the head thrown well back so that the blood runs into the upper part of the pharynx. He uses a type of gag devised by a former colleague, the late Sir Thomas Smith.

Of the actual operation he calls attention to two points, first, the importance of an adequate but careful separation of the soft parts from the bony palate, taking care not to endanger their vitality by hazarding the blood supply or by damaging the muscles of the soft palate unduly, and secondly, the lateral incisions should be as short as possible, seldom more than half an inch in length. He would rather depend upon the use of deep tension stitches for the soft palate than upon very long lateral incisions.

In after treatment the patient is fed on nothing but milk or milk and water for at least a week. No washing or spraying of the mouth is permitted, except that on each occasion after feeding the child is given a drink of warm water. The patient is kept out of doors as much as possible, weather permitting.

On the fourth day the palate is inspected and it is decided when the tension sutures, if in use for the soft palate, should be removed, usually on the fifth or sixth day. He maintains that if the operation has been carefully and properly done with gentleness, avoiding excessive bruising of the tissues and loss of blood, it is seldom that a complete failure occurs.

The discussion was carried on by surgeons having a special interest and experience in this particular type of operative work, and revealed the fact that the majority were practising the lateral approximation operation with certain peculiar differences in technique. There was by no means unanimity of opinion as to the best method of relieving tension on the suture line. Most appeared to be in favour of a long lateral incision in spite of the president's declaration of preference for the short incision and the use of tension sutures.

Mr. O. L. Addison (London) expressed his conviction that success could be

obtained only by the avoidance of tension and sepsis, and to prevent the former long lateral incisions were an absolute necessity.

M. Victor Veau (Paris) described a modified flap operation which he had developed on the basis of Lane's method and which was giving in his hands excellent results.

Mr. C. H. Fagge (London) operating for complete clefts advocated a two stage operation, first stage by a Lane flap operation at about the second to third month, second stage by a Langenbeck operation on the soft palate before the troubles of the first dentition began. He further expressed himself to be in strong disagreement with the use of tension sutures which he said sloughed or acted as unnecessary foreign bodies.

Mr. Grey-Turner (Newcastle) described a very good exposure by using von Eiselsberg's gag, the patient being placed in the head down position. Anesthesia is obtained by ether oxygen administered from a Shipway apparatus through a catheter conducted into the naso-pharynx. He further emphasises a scrupulous regard to minimise haemorrhage, maintaining it is not sufficient to mop up the blood; it must be arrested by steady sponge pressure, and the time necessary for this purpose must never be grudged. He gives a warning that an efficient suction apparatus may be a disadvantage by disguising a really serious loss of blood.

Mr. Kelsey Fry (London), speaking from the point of view of a dental surgeon, and one who has been associated with Mr. H. D. Gillies in the treatment of cleft palate cases, declared that the closure of the hard palate may be the cause of a contracted arch, a loss of contour of the face, and a cause of bad speech, by the pulling forward of the soft palate towards the middle of the palate; all of these could be avoided by the use of a plate to close over the opening. Plenty of tissue to form a freely soft palate would be left; this will restore to the child the all important function of speech.

A written communication was received from Dr. Truman W. Brophy (Chicago) wherein he tabulates some 1706 cases of this special operation done by American colleagues giving results as to mortality and necrosis; unfortunately he makes no definite statement as to phonetic results. This omission renders any practical comparison of results impossible. The Brophy operation is not widely practised in this country, partly because it is said to be accompanied by a greater degree of shock than occurs in the other types of palate operation, and also because the forcing together of the under developed maxillary bones alters materially the subsequent growth and contour of the face bones.

The Bradshaw Lecture at the Royal College of Surgeons on November 10th was delivered by Sir Cuthbert Wallace, K.C.M.G., a vice president of the College of Surgeons and surgeon to St. Thomas's Hospital, under the title "A Review of Prostate Enlargement." In his introductory remarks he said: "Recent years have added little to our knowledge of the function of the prostate. It is not apparent that it has any internal secretion or that it exercises any influence on metabolism; it is a secondary sexual gland."

In his short historical survey he quotes the following paragraph from a lecture delivered by Moynihan in 1908: "The first suprapubic prostatectomy done in England was performed on March 24th, 1887, by McGill. In that operation and in many subsequent ones he removed only a small portion of the prostate in one piece, or in many pieces, cutting away the projecting and obstructing parts of the gland with scissors. Later Mr. Jessop introduced his "ring scissors" which made this piece-meal removal of the gland an easier matter. The first attempt at enucleating a portion of the prostate was made in Leeds on December 15th last by Mr. Edward Atkinson. This was during my House Surgeoncy, and I quite well remember the enthusiasm the genial operator had for the case and the simplicity of the

procedure. On December 17th, 1887, Mr. McGill employed this method of enucleating; a portion of the prostate weighing 20 ozs., 4 grs., which surrounded the urethra laterally and below, was enucleated in one piece."

Moyniham was at this time a resident at the Leeds General Infirmary and so far as the history of the suprapubic operation in this country is concerned, these dates can be considered authentic. These early enucleations initiated by McGill were, however, attended by a high mortality from the fact that the attempts were made on patients whose general condition was extremely bad. The profession in England as a whole did not favour these operations even in thec losing years of the last century and eagerly took up the so-called sexual operations only to find them for the most part ineffective. It was not until Freyer published his series of successful cases in 1900 that the real value of the suprapubic prostatectomy was established.

The lecturer put forward some general views on the causation and nature of the enlargement, and of the ensuing symptoms. The fate of the cavity left by the operation is remarkable, in that it rapidly contracts and not only are the sides brought together but the bladder is at the same time approximated to the urethra. This contraction he asserts is caused by the resilience of the remaining part of the prostate and it may be looked upon as one of nature's means of producing hemostasis; it also reduces the surface to be covered by epithelium. He states further that should the opportunity arise of inspecting and digitally examining the bladder again after a prostatectomy, it is remarkable how little abnormality is to be made out. In his reference to the two stage operation, he says the discovery and perfection of tests of urinary efficiency have extended and rendered more accurate the indications for the performance of this operation. He says later, however, that the surgeon has been more chary in performing the one stage operation, and the deaths that formerly would have been recorded under prostatectomy are now to be found under the head of cystotomy. Nevertheless, a striking fact is the good results that follow the two stage operations in spite of certain disadvantages.

The suprapubic method is undoubtedly the method of choice for most general surgeons. The perineal operation in the hands of Hugh Young is a wonderfully effective operation with an extremely low mortality compared with the hospital figures quoted by Wallace, who gives for a total of 219 cases operated on between 1922 to 1926 a mortality of 20.1 per cent.

This figure appears very high for our present day technique compared with those from some special hospital's. American statistics and the lecture has led to a certain amount of correspondence. Sir. T. Carey Evans thinks the lecture and figures quoted afford clear evidence of the necessity for establishing genitourinary departments in all our large general hospitals, and for encouraging specialisation in this important branch of surgery. He has always looked upon suprapubic prostatectomy as a special operation requiring in its performance a particular knack or gift which is only acquired by, or bestowed upon, surgeons who eventually specialise in this particular branch of surgery. He maintains that so long as it is claimed that this operation is part of the general surgeon's work the mortality rate will remain where it is. This latter contention of Sir Thomas's does not, and will not, find favour with the general surgeon; the improvement must come from earlier operation, more care in the selection of cases, gentle surgery, and more detailed care in the preoperative and postoperative phases. Wallace quotes Young's and also Wildbolz's figures for perineal prostatectomy, viz., 3–4 per cent and 6.5 per cent respectively, and says earlier in his paper "that if it could be shown that children had been born to parents who had undergone perineal prostatectomy, it would be a point in favour of that operation, as a

restoration ad integram is always desirable. I am unaware, however, that a man has ever begat a child after prostatectomy." Curiously this statement has been replied to by Sir John Lynn Thomas and C. C. Elliot who give definite instances of paternity of men from whom they have sometime previously removed the prostate.

A short article by G. P. Mills, F.R.C.S. (Birmingham), on tennis elbow to the *British Medical Journal* has aroused the interest of the lay press in quite an exceptional way, more especially as it is an extremely common condition, not only in tennis players and golfers, but in workers in some general trades where strain is put upon the elbow.

There has been much discussion in the past as to its cause but no definite line of treatment has been evolved giving satisfactory results to these sufferers, so they invariably fall into the hands of the osteopaths and bone setters.

Mills' description of the symptoms and signs are brief but to the point. He says, "I found in all the recognised tender spot, which varied in position but was usually just above or below the epicondyle and, as had been described before, that the pain was often produced by complete flexion of the wrist and fingers; also that on superficial examination all movements were complete. When however I specially examined combined movements this was not the case. Frequently for example with full pronation combined with complete wrist and finger flexion the elbow would not come perfectly straight, or if it did come straight there was a distinct feeling of resistance and the process was painful. This is of course a complicated movement but a similar movement of the opposite limb was free and painless. This fact, together with the known frequency of cure by forcible manipulation, strongly suggested that forcing the restricted movement might bring about the desired result.

"My first case was rather dramatic. The patient was a very strong man and I insisted on an anesthetic. Under nitrous oxide I wrenched the arm; with the wrist and fingers flexed and the forearm fully pronated, I forced the elbow into hyperextension, making at the same time firm pressure with my left thumb over the tender spot by the external epicondyle. There was a snap like a pistol shot and the horrified anesthetist insisted that I had broken the arm. The cure was as dramatic as the manipulation."

Mills says that the test of the cure is that the patient can play tennis without pain. He has performed the manipulation both with and without an anesthetic, and so far has had no failure, and in every case has felt a click or snap but not always audible or noisy as in the first instance. His conclusions are commendably short so I take the liberty of quoting them in full.

1. The majority of cases of tennis elbow present characteristic symptoms of physical signs.

2. These cases can be cured by simple manipulation, preferably carried out under nitrous oxide anesthesia.

3. The pathology of the lesion is uncertain but it is suggested that in acute cases a portion of the orbicular ligament may slip between the radial head and the capitellum.

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Burnley, England.

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[From Fernelius' Universa Medicina, Geneva, 1679.]

BOOKSHELF BROWSING

ALEXANDER J. C. SKENE, M.D., LL.D.

PERSONAL REMINISCENCES

JOHN COWELL MACEVITT, M.D., LL.D.

BROOKLYN, N. Y.

IN this short biographical sketch, it is not my desire to idealize Dr. Skene, as Ian Maclaren in "Beside the Bonnie Briar Bush" idealized his compatriot, the lovable little Dr. Willum McClure of Drumtoochty, although I feel that had Dr. Skene been placed in the same environment among the poor Scottish peasants of the hills and moors of Scotland, he could well have served as a subject for the delightfully descriptive pen of Maclaren as a doctor who loved his fellowman before himself, as did McClure.

I suppose when the dust from the pathway of life rests upon your hair and you perceive the commencement of the evening's glow, you are apt, as I am, to conjure up personalities who in your early career were pioneers hewing their way through the forests of the unknown to reach the open field of gynecology awaiting cultivation.

Looking down the vista now fading into a mist, I gather around me the shades of the Brooklyn gynecologists whom I had the honor to know and to whose councils as a youthful disciple I was admitted. From among this group, I shall select one whose achievements in aid of womankind were recognized and his name glorified, wherever on the globe civilization existed. Yet these achievements were but part of the man, the greater ones, it is true; but his versatility in the artistic beauties of life (apart from his profession) was astonishingly brilliant.

Brooklyn, the city of his adoption, had just claims to many other medical men possessing international renown, but none lay closer to her heart nor did her civic pride glow with greater warmth than at the mention of the name of Dr. Alexander J. C. Skene. A bronze bust on a marble pedestal, erected on a hillock at the entrance of Prospect Part, testifies to the love and esteem in which he was held by his patients and friends.

Dr. Skene was born in the parish of Kyvie, Aberdeenshire, Scotland, June 17, 1838. His forebears were members of a clan prominent in the annals of Scotch history for centuries. He died July 4, 1900, at the age of 62 years, at his country home, Highmount, Catskill Mountains, New York. His early education was obtained in the day schools of Aberdeenshire and finished at Kings College. In 1877, the University of Scotland conferred upon him the degree of LL.D.

He came to America at the age of nineteen years. Three years afterward he took up the study of medicine at Toronto,

Canada, under the preceptorship of Dr. Alexander McKinnin, the custom of that period. He was a matriculant at the University of Michigan, 1861–1862. In 1863 he received the degree of M.D. from The Long Island College Hospital. His preceptor in the latter instance was Dr. Gilfillan, a noted Brooklyn physician.

With all the love for the motherland which a Scotsman holds, his true Americanism is shown by his voluntary enlistment

Fig. 1. Dr Alexander J. C. Skene (1838–1900).

in the Federal Army, receiving the appointment of Assistant Surgeon in the volunteer corps. He saw active duty at Port Royal, Charleston Harbor, and at David's Island. He became prominent in devising plans for an army ambulance corps, which was the beginning of the system then and now recognized as most essential as one of the humanitarian necessities of war.

Returning to civil life at the close of the war, he entered upon the practice of medicine in the city of Brooklyn where he remained without interruption during his professional career. His ability soon became recognized and within a year he received the appointment of adjunct professor of obstetrics and gynecology at Long Island College Hospital. This appointment brought him more prominently before the medical profession of the country and was the commencement of that career which brought him renown. His generosity and charity kept the emolument from his large clientele within an amount commensurate with maintaining a befitting station in social life.

In reading a biography the reader naturally desires to visualize the physical and personal attributes of the subject. Divesting him of his eminent qualifications, let us view him as a man on the street. He was of medium height, commanding in appearance, emphasized by a wonderful chest development. He was always neatly and soberly dressed, eschewing the sartorial changes in fashion. His gait was slow and measured as he meditatively walked along. His face was of a ruddy tint; his eyes, peering from beneath heavy eyebrows, were inquisitorially bright; his hair, dark and curly, he permitted to grow rather long; his nose was straight and well-formed; his mouth and chin indicated firmness. He wore a mustache, and a beard covered the lower portion of his face.

If you were a stranger, and had occasion to accost him on the street, his eyes and smile would bespeak a cordial greeting. His reply to your inquiry would be such that you would mentally observe, "What a charming, courtly gentleman." If the observation were by a street-sweeper or poorly-dressed individual it would be, "Take it from me, that guy is a good old skate." This homely picture tells its own story.

With his artistic temperament, he loved Nature in all her varying moods. At his country home, away from the turbulence and strife of urban life, he indulged in the lighter literature of the day, modeled

clay, sketched, and chiseled marble. The sculptured marble bust of Dr. Marion Sims, which now adorns the lobby of the building of the Kings County Medical Society, gives evidence that had he pursued the art of sculpture he might have become equally famous.

An outstanding trait in his character was his friendship for the younger men, particularly for those following in his special line of work. Upon one occasion he jocularly observed, "These youngsters are following so close behind me that they kick my heels." One of the younger members of the Kings County Medical Society presented, with fear and trepidation regarding its reception, his first medical essay, entitled "Tubo-ovarian Congestion Simulating Appendicitis." The president called upon Dr. Skene to open the discussion. You can imagine the neophyte's surprise when the doctor arose and said, "I may say, first of all, I appreciate the sagacity of the reader of the paper to select a subject for our consideration of so much interest at the present time. I also appreciate his ability to put together in such a concise form and so briefly many facts that are so suggestive and which especially invite discussion. If I fail to do the subject justice, it is not because the author has not paved the way for me." This was Dr. Skene's method of encouragement for the benefit of other novices.

The graciousness of Skene's manners, his sympathy and kindliness of spirit made him hosts of friends in and out of the profession.

Ye gods! The audacity and presumption of youth! The modesty and benevolence of experience. The writer had under his charge a middle-aged married woman whose home was a three-room flat in a poverty-stricken district of the city. Her husband was a dock laborer. She became incapacitated for work, due to the presence of a large ovarian tumor. She could not be persuaded to enter a hospital for its removal. "I will die first," she said. Her husband was appealed to. He said, "I know her. When she says she won't, she won't; and that's all there is to it." Finally she agreed to the operation if performed at her home. It was not unusual, at this period, for surgeons to operate at the home of the patient.

The situation was explained to Dr. Skene. "Logically," he replied, "you have but two decisions. If you care to accept the hazard, operate; or, relinquish the case to some other surgeon." I answered,

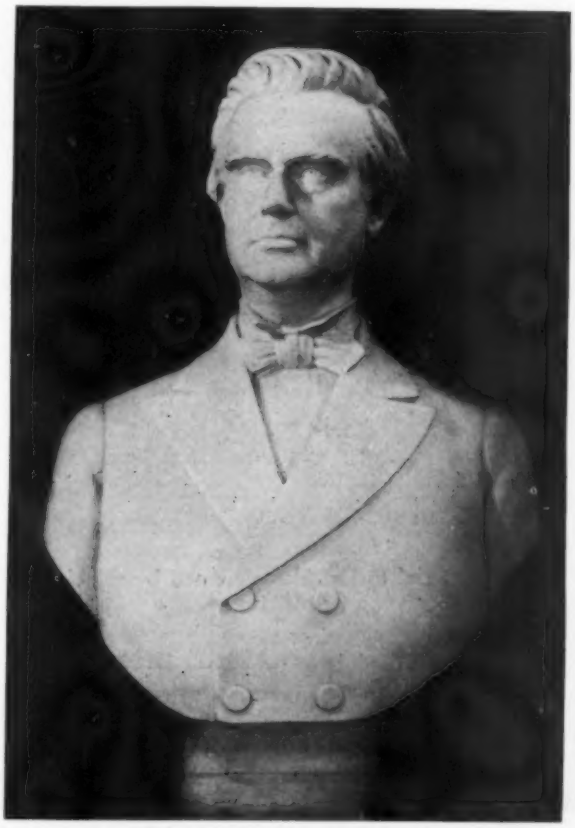

Fig. 2. Bust of Marion Sims, modeled in marble by Dr. Skene. Property of the Medical Society, County of Kings, Brooklyn.

"I would like to operate. Could you possibly find the time to assist me?" "Well! Well!" he replied, adding with a smile, "Maybe it would be just as well for the patient's sake." The genial irony passed unperceived by me in the pleasure of his assent. At this time he was in the zenith of his career and time to him was valuable.[1]

For two days, Dr. Walter J. Corcoran

an assistant of Dr. John Byrne, and myself, washed, scrubbed, and sterilized the kitchen, the room where the operation was to be performed. A complete surgical armamentarium was brought from the hospital. When all was in readiness the patient was placed on the table and anesthetized by a specialist in anesthesia. The scalpel was offered to the Doctor. "You are the operator," he said; "I am the assistant."

Fig. 3. Memorial to Dr. Skene erected by the citizens of Brooklyn.

A central incision was made. It would occupy too much space to describe the technique of the operation, except to say that it proved to be a multilocular cyst with intestinal, parietal, and omental adhesions everywhere. One knows what that condition means. Dr. Skene, recognizing the difficulty and gravity of the case, assumed charge. The awed, would-be operator and Dr. Corcoran, in silence, acted their proper capacity as assistants. Two hours were required to complete the operation. At its conclusion, Dr. Skene, wiping the sweat from his face, said, "By no means a simple case. My congratulations, doctor." A feather would have dealt me a mortal blow.

It can be truthfully said that no physician in Brooklyn was more liked and admired by his confrères than was he. He was the embodiment of simplicity and strength; he was innately dignified and refined, blind to faults and deaf to the criticism of his fellows.

It is difficult to treat, episodically, his multiple activities for they continuously intermingled. So great were his contributions to medical literature that in a short biographical sketch such as this it would be impossible to enumerate or comment upon them individually.

The late Dr. William Shroeder classified by title over two hundred medical papers, forty-one positions of honor and distinction which he held, and named thirty-one surgical instruments which he devised. The wonder is how he found time, aside from his extensive private practice, to devote himself to so many different attainments. However, a general survey of his more important literary and medical endeavors will be easier of accomplishment.

As a teacher and lecturer he possessed a graceful delivery without any attempt at oratory. In description he was forceful, employing short, terse sentences. His skill in drawing enabled him to illustrate clearly anatomical and surgical problems to the mind of the student. Mindful of their future strife to gain a livelihood, he would take occasion to bring before them the sacredness of their chosen profession, and by word and example to instil the thought that its purpose was the alleviation of the sick and not material gain; to be chivalrous in their bearing toward their competitors; to develop that urbanity and kindliness of manner which bespeak the gentleman, and an encompassing sympathy for the afflicted. On the day he lectured, seats were at a premium. He was idolized by his students. Away from the platform, it was a delight for him to mingle with them; when later, they engaged in practice, he remained their counselor and friend.

As an author he wrote: "Medical Gynecology, a Treatise on the Disease of Women from the Standpoint of the Phy-

sician;" "Education and Culture Correlative to Women;" "Diseases of Women and Children;" "Electro-Haemostasis in Surgical Operations;" "Diseases of the Bladder and Urethra in Women." He discovered the glands which now bear his name; and the knowledge of their existence aids in successfully treating an otherwise intractable disease. Many of his accomplishments were of greater importance, yet the discovery of these glands will leave his name imperishable in the annals of medicine.

He was also the author of a novel, "True to Themselves." One evening after office hours, having occasion to visit him, I was ushered into his private library where I found him engaged in writing, with leaves of manuscript scattered over his table. The occasion of my visit settled, as I was about to take my leave, he said, "If you are not in a hurry, I would like to read something to you. I am committing some of my experience to paper in the form of a novel. Give me your opinion as to how this reads." Taking from a drawer some completed manuscript, he read for an hour or so, excerpts from his composition, "True to Themselves." I fear I was more elated with the compliment than interested in the story. He was undoubtedly inspired to emulate Dr. Oliver Wendell Holmes and Dr. Weir Mitchell, but he did not quite catch their imagery or wizardry of diction. He called it "A Psychological Study." A more correct title, in my opinion, would have been "A Romantic Psychological Autobiography."

In an editorial capacity, he was a collaborator of the following publications: *Achives of Medicine, American Medical Digest, New York Gynecological and Obstetrical Journal, Journal of Nervous and Mental Diseases.* He was also a corresponding member of the following foreign societies: Société Royale des Sciences Médicales et Naturelles de Brusselles, Die Gesellschaft für Geburtshülfe zu Leipzig (at the celebration of their four hundredth session), Société Obstetricale et Gynecoligique de Paris, Edinburgh Obstetrical Society. (Honorary Fellow of), British Medical Society.

All of his writings display an ease in composition. He expounded his text with a vigorous simplicity, lucid in detail, and felicitous in expression. It required no deep concentration to grasp his meaning. His talent for description placed before the reader a distinct picture. He wielded his pen with the same infinite grace as he did his scalpel,—both cut cleanly.

As a gynecologist and surgeon, he entered the field of gynaesic abdominal surgery at an epochal period. From the time of Dr. Ephraim McDowell, who published the first authentic report of ovariotomy in 1809, until 1864 it was a debatable procedure. In 1921 Dr. Nathan Smith, of this country, operated successfully, tying the pedicle with ligatures cut from the Doctor's buckskin gloves. In 1872 Robert Batty of Georgia performed an ophorectomy for the removal of healthy ovaries to cure dysmenorrhoea. In 1851 Grenzer, a German surgeon, wrote that most ovariotomies within the last forty years had had a fatal termination and as a consequence reliance could not be placed in its successful performance. Confidence was altogether shattered when the celebrated surgeon, Dieffenbach, declared against it. Kiwisch, about this period, collected statistics of 54 cases of which 51 ended fatally. In America and England no such number of fatalities occurred; and in this country, particularly, the mortality lessened with increasing rapidity. In 1852 Dr. Edward Martin declared that the questions of propriety and expediency of ovariotomy was but of conditions favorable to success.

With the advent of asceptic surgery, improvement in technique, instruments of precision (of which Dr. Skene invented many), the prominent surgeons of America operated without fear of fatal results. As we now look back and recall discussions of the leading gynecologists, we can see how gradual was the improvement in technique to attain its present status.

Consider how slowly and carefully the incision was made in the opening into the abdominal cavity, the postoperative flushing of the cavity with pitcherfuls of water, the cauterizing of the pedicle with the paquilin or galvano cautery after its ligation with braided silk thread, the attaching of the stump to the abdominal wound, the drainage in non-septic cases by glass tubes formed to follow the curve of the uterus, and the use of the combined abdominal and vaginal gauze drainage to an extent of producing sometimes a mild form of iodoform poisoning. The foregoing incidentals of technique were overshadowed by the fear of the advent of septicemia, peritonitis, hemorrhage, or shock.

Passing Long Island College Hospital one morning, I met the Doctor. "Good morning! I am about to make my rounds. Come along." In his tour he brought me to the bedsides of six women upon each of whom he had performed an ovariotomy and who were then far advanced in their convalescence. Knowing the results of other leading surgeons, I felt that I was in the presence of a master surgeon.

In the beginning of his abdominal surgery work, he was timidily progressive, carefully studying the history and the individuality of each prospective ovariotomy. In time success gave him assurance for that celerity in operating for which he was noted, and permitted him to give play to the exercise of his originality. He lacked the laboratory of today in aid of diagnosis, but he had that intuitive mental endowment, that vital something, that creates the great artist and the great surgeon.

It was said of him that few operators were able to handle surgical instruments with greater dexterity than he. "That his technique was so quiet and singularly simple, only a brother surgeon could appreciate its speed and thoroughness." If when operating, some unexpected pathological condition appeared, there was a momentary hesitation and the difficulty was decisively met. He never seemed perturbed or irritated. He worked with the placidity of a deep flowing stream, preserving an even poise from the commencement to the completion of the most difficult operation. Dr. Skene was a splendid surgeon possessing all the fundamental virtues of a Christian gentleman.

BOOK REVIEWS

We have so many worth while books to tell you about this month we shall waste no time in fashioning an introduction but go right to the subject matter.

Doctor Thomas Kirwin kindly reviewed William F. Braasch's "Urography." His article reads:

UROGRAPHY. By William F. Braasch, B.S., M.D., F.A.C.S., in collaboration with Benjamin J. Hager, B.S., M.D. Ed. 2, revised and enlarged. W. B. Saunders Co., Phila., 1927.

Though intended especially for those restricting their professional activities to urology, this treatise should make an equal appeal among internists and general practitioners; indeed, it would not be too much to say that what it contains is of the most vital interest to every individual engaged in the treatment of disease of the human body, wherever located. While produced as a second edition of the author's "Pyelography" published in 1915, this is to all intents and purposes an entirely new exposition of the subject, so great have been the advances made in this special form of diagnosis during the past ten years.

In his position as head of the urologic department of the great Mayo Clinic, the author has an almost unequaled amount of clinical material upon which to make observations. That he has made good use of his opportunities the 759 roentgenograms which he has selected to illustrate the exposition of his technique and results bear graphic witness. Only those who have devoted much of their professional energies to the interpretation of roentgenograms of the urinary tract and the application of the information therefrom derived, can truly appreciate the inestimable value of what is so lavishly placed at our disposal. Yet he who looks at a pyelogram for the first time will

immediately recognize that the opportunities for comparison and study which the material contained in this volume offer can be equalled nowhere else outside of an exceptionally large clinic such as the one which made the compilation of such a treatise possible.

The chapter on the normal renal pelvis is very valuable, but it would seem that even more attention could have been given to this subject without emphasizing too strongly the vital necessity of being thoroughly familiar with the normal before attempting to recognize and interpret the abnormal. Of especial interest are the often brief suggestions as to typical pathologic appearances, as the "typical lobulated diffuse shadow occurring with calcareous renal tuberculosis" depicted in Fig. 301, and many others. The plan of arranging the plain roentgenogram first made beside the exposure after an opaque medium had been injected, illustrating graphically how easily grave errors may arise when reliance is placed upon either one alone, is most excellent. Another reason every reader should feel grateful is that the author has not hesitated to record his errors and to deduce therefrom means by which those who follow his teachings may be saved from doing likewise. His warnings as to situations where the employment of urography is unwise are as emphatic as those of its most persistent opponents, and the reader involuntarily feels greater confidence in following the lead of one who never permits the enthusiam which he feels for his subject—abundant existence of which is furnished by every page—to run away with his sound judgment and dispassionate estimate of the limitations and pitfalls by which it is surrounded.

The make-up of the volume leaves much to be desired. The busy practitioner would find it of easier reference if sub-titles were made more prominent and the index were more complete. Often one must thumb over many pages before coming upon the exact bit of information or the particular figure which he needs in his daily clinical rounds. These are minor blemishes in a work of such value as to defy estimation, but it is to be hoped that another edition may give greater attention to these mechanical details, making the former worthy of the material it presents.

When we received the *Italian Archives of Surgery*, commemorating Dr. Raffaele Bastianelli's twenty-fifth year of professorship, his friend, Dr. Paola De Vecchi was appealed to do the review which follows:

Archivio Italiano di Chirurgia, xviii. Scritti in onore di Raffaele Bastianelli, nel xxv anno di insegnamento. 8vo. Paper. Pp. 711; illus. Bologna, L. Cappelli, 1927.

A testimonial anniversary of his twenty-fifth year of professorship was given to Dr. Raffaele Bastinelli of Rome by his old pupils, and his many friends and admirers in Italy and in foreign countries, among them some prominent American surgeons.

Many of these colleagues contributed original articles on medical and surgical subjects, which were collected and published in the *Italian Archives of Surgery*, directed by Dr. Mario Donati and edited by Licinio Cappelli of Bologna.

This volume is a credit to the editor as well as to the committee of arrangement, and in the 700 neatly printed pages collects some very valuable papers on different phases of surgery. The articles are fifty-four in number, of which six are from American surgeons, one from an English and three from French surgeons.

It is among the first works of this kind, published as it is for a testimonial to one man who has won an international reputation for his constant work in the field of scientific and practical surgery and who has contributed to surgical progress in the last score of years.

Dr. Raffaele Bastianelli is well known among the professional men of America, for on many occasions while visiting the schools of medicine in this country he has delivered interesting lectures on various surgical subjects.

In Rome he is the leading surgeon, and many of our American colleagues while visiting in that city have had the opportunity of enjoying his hospitality, as well as assisting at some of his brilliant operations. These operations have been performed first at the Polyclinic where he delivered lectures for twenty-five years, and more recently at his private sanatorium, where he continues to practice and teach modern surgery.

The surgeons from this country who have contributed original articles to this volume are Dr. F. H. Albee, on extraarticular arthrodesis in tuberculosis of the spinal vertebrae, hip-joint and sacroiliac joint; Dr. W. J. Mayo, on surgical diseases of the spleen; Dr. E. Starr Judd, on colecystitis; Dr. E. Beer, on the clinical and pathological analogies between the

urinary and biliary tract; Dr. J. C. Bloodgood, on acute and chronic dilatation of the duodenum and on gastroenteric ileum; and Dr. Vincent Gaudiani, on how to deal with the ureter in its extravesical insertion.

We were under the weather one week-end and occupied our time with a perusal of the several good books, the first of which is:

Rebuilding the Child, A Study in Malnutrition. By Frank Howard Richardson, A.B., M.D., F.A.C.P., containing an introduction by Wm. R. P. Emerson, A.B., M.D., Professor of Pediatrics, Tufts College Medical School, Boston. G. P. Putnam's Sons, N. Y., 1927.

We copy the blurb on the cover, "This book is a study of the vast number of school and preschool children who are for some reason below par, over-tired,—in a word, falling short of the joyous, abundant health that is the birthright of every child . . . he [Dr. Richardson] addresses himself,—'The four learned professions of Parents, Teachers, Nurses and Doctors!"

This is a popular book inasmuch as layman or physician may read and enjoy, absorb and comprehend. The blook is 319 pages long and has 44 illustrations, for the most part from actual photographs.

Such topics as An Old Disease in a New Garb, Making the Diagnosis of Malnutrition, Faulty Health Habits, Family and School Strain, Physical Defects, Fatigue, The Nutrition Class, Home Treatment, Malnutrition and Measured Feeding, Nutrition and the Overweight Child, Posture, Mentality and Malnutrition, The Cure of Malnutrition, and What Has Been Written about Malnutrition, have been done in a manner that will appeal to the parent and the general practitioner. We omit the specialist in pediatrics as this book to him would at best be juvenile. But the rest of the world may follow the written lines and here and there find a pearl of knowledge and wisdom.

The next to engage our convalescent minutes was:

The Endocrines in General Medicine. By W. Langdon Brown, M.A., M.D., F.R.C.P., Physician to St. Bartholomew's Hospital, London. Paul B. Hoeber, Inc., N. Y., 1927.

The first sentence of the Preface reads, "In this book I have attempted to give a brief account of the endocrine system and its diseases in a form which I hope may be of service to the general practitioner."

Doctor Brown has lived up to that promise and, in addition, has written an engrossing book on what, to many, is a deep subject. Why so many physicians look upon the general topic of the endocrines as something to avoid and leave to the other fellow is a mystery. Surely merely because the study as a whole is in its infancy and yet governs such a large part of general medicine, it should attract the majority of the men in practice.

This book is chiefly a record of Dr. Brown's personal experience, first in the laboratory, later at the bedside. He has linked the physiological and clinical methods, and given an account of the biological position of the endocrine system in relation to the viceral nervous system.

The book begins with a chapter on the biology of the endocrine system. Then the endocrine system in childhood is covered. There follows chapters on the thyroid gland, the parathyroids, the pituitary body, the adrenals and the chromaffin system, the retarding glands, the endocrines and the gonads, the endocrines and general metabolism, the endocrines and the psychoneuroses, endocrine therapy, and the future of endocrinology.

The book is engaging in style. Parts of it read like a good novel, as, "We ordinarily think of the evolution of the nervous system as peacefully accomplished. A struggle between two animals or two species we recognise. But it would appear that a similar struggle accompanies the integration of the multicellular individual. Many apparently peaceful events in nature prove on closer analysis to involve a concealed struggle. Man is a gregarious animal, but he has not found it an easy task to adjust the desires of the individual to the needs of the community. Philosophers may lament this, theologians may attribute it to original sin, but it should lead the biologist to enquire whether the cells of which he is composed have always found it easy to sink their individuality in that of the organism."

After one has read this book he will have a good and workable knowledge of the subject. To be a good surgeon, gynecologist or internist, one must be on more than speaking acquaintance with endocrinology. To have had a book done on this topic that covers the ground thoroughly, giving the meat of the subject and forgetting the trimmings of speculation,

giving it to us in a style distinctly literary, and boiling the whole down to a hundred and forty-four pages, which includes an index, makes it a work that should find favor with the profession at large, a book that should grace many libraries.

The third book made a dull Sunday pass more swiftly. We refer to:

Appendicitis. By Hubert Ashley Royster, A.B., M.D., Surgeon to Rex Hospital; Surgeon-in-Chief, St. Agnes Hospital, Raleigh, N. C.; Former President Southern Surgical Association. Surgical Monographs, Under the Editorial Supervision of Dean Lewis, A.B., M.D., Director of Surgery, Johns Hopkins University; Eugene H. Pool, A.B., M.D., Attending Surgeon, New York Hospital; Arthur W. Elting, A.B., M.D., Professor of Surgery, Albany Medical College. D. Appleton and Company, New York, 1927.

Doctor Royster in his preface says in part, "The purpose of this monograph is to present a study of inflammation of the veriform appendix . . . Within the past few years no treatise on the appendix has appeared, while the numerous articles published in medical journals lack correlation and need integration in the light of more recently acquired knowledge and of enlarged experiences . . . This monograph is an effort based on the hope that it will clarify the questions which have been brought to the surface by the shifting period which is now present in our attitude towards appendicitis and that the writer's endeavor to stabilize contemporary opinions will be welcomed."

This book is welcomed to the company of all good books. We hope it will be widely read, especially by the general practitioner and the man who believes in trying to prevent or cure appendicitis by "freezing" it.

The book opens with a heading, "'Last Words On Appendicitis." The first quotation is from the pen of the late John B. Murphy, written in 1915, "Is it time to stop talking about appendicitis? No! It is just the time to begin talking about appendicitis and talking most seriously and emphatically about it."

To which the reviewer cries out a loud, "Amen!" in the year of our Lord, 1927.

Chapter I deals with a historical sketch of appendicitis. Perhaps we have a weakness for things historical. We believe one is not cultured in his profession or speciality unless he has acquired a thorough knowledge of the historical background of his calling. And so this sketch on the history of appendicitis is fascinating reading.

The anatomy of the cecum and appendix follows, and is recommended to surgeon and internist that their anatomical memories may be refreshed. A chapter on Physiology is next in order, and in its train comes Etiology, Pathology, Symptomatology, Diagnosis, Complications, Appendicitis in Children, Prognosis, and Treatment.

Topographically the book has been well done. In length it is 370 pages, with 56 illustrations and two colored plates.

We earnestly and seriously recommend Dr. Royster's monograph to many Doctors of Medicine.

The last book to engage attention and so close the review for this month is:

Nasal Neurology, Headaches and Eye Disorders. By Greenfield Sluder, M.D., F.A.C.S., Clinical Professor and Director of of the Department of Otolaryngology, Washington University School of Medicine, St. Louis. 8 vo. Cloth. $11.50. Pp. 428; 167 illus. C. V. Mosby Co., St. Louis, 1927.

Sluder's book is a contribution both to clinical medicine and anatomy: to the former because of its content of valuable clinical experiences and ideas and to the latter through the suggested points of attack in anatomical research.

It is a compilation of the previously published works of the author on the referred pains produced by sinus disease, with many additional comments. Most extensively treated are the experience of Sluder and others, both corroboratory and contradictory, in vacuum frontal headache, "anterior ethmoidal neuralgia," "lower half" headache and the neurological sequelae of hypertrophic sphenoidal sinusitis.

Each of the four main conditions dealt with is introduced in an anatomical substraction, as fully presented as present knowledge will permit, and is developed through clinical, diagnostic, pathologic and therapeutic treatises. There are chapters in surgical technique, and a brief one in orbital abscess. The observations in injection of the nasal ganglion for various sorts of pain—the "lower half" headache in particular—are perhaps the most interesting and suggestive.

In this decade, which has been so lightly given over to fantastic and general accusation of the sinuses for almost every form of symptom and lesion, it is astonishing that so little sound fact on the question has been gleaned. It may be hoped that Sluder's work may begin to stem the flow of conversational pathology about the sinuses, and orient future thinking on the subject along more rational and anatomical lines.

The chapter on "Some Neurological Problems in Rhinology" gets away from actual observation into speculation which does not seem very valuable.

We come to a book that is not scientific and yet has a direct appeal to the physician. Mother India. By Katherine Mayo. Illustrated. Harcourt, Brace and Company, New York, 1927.

It is a best seller among books listed as non-fiction, and justly so. Recently there has arisen a keen discussion whether or not the author has distorted the facts and has drawn a true picture. Unless one has gone to India and knows conditions at first hand, he is in no position to take sides. It is best for the reader to follow the pages and form an opinion.

The physician will be interested in the custom of child marriages, native obstetrics, public health work, and the weird superstitions of the native people. It is fascinating reading and we warn every physician who buys a copy to read it before the other members of the family discover it, for, once it becomes family property, the saying, "possession is nine points of the law," will become a reality.